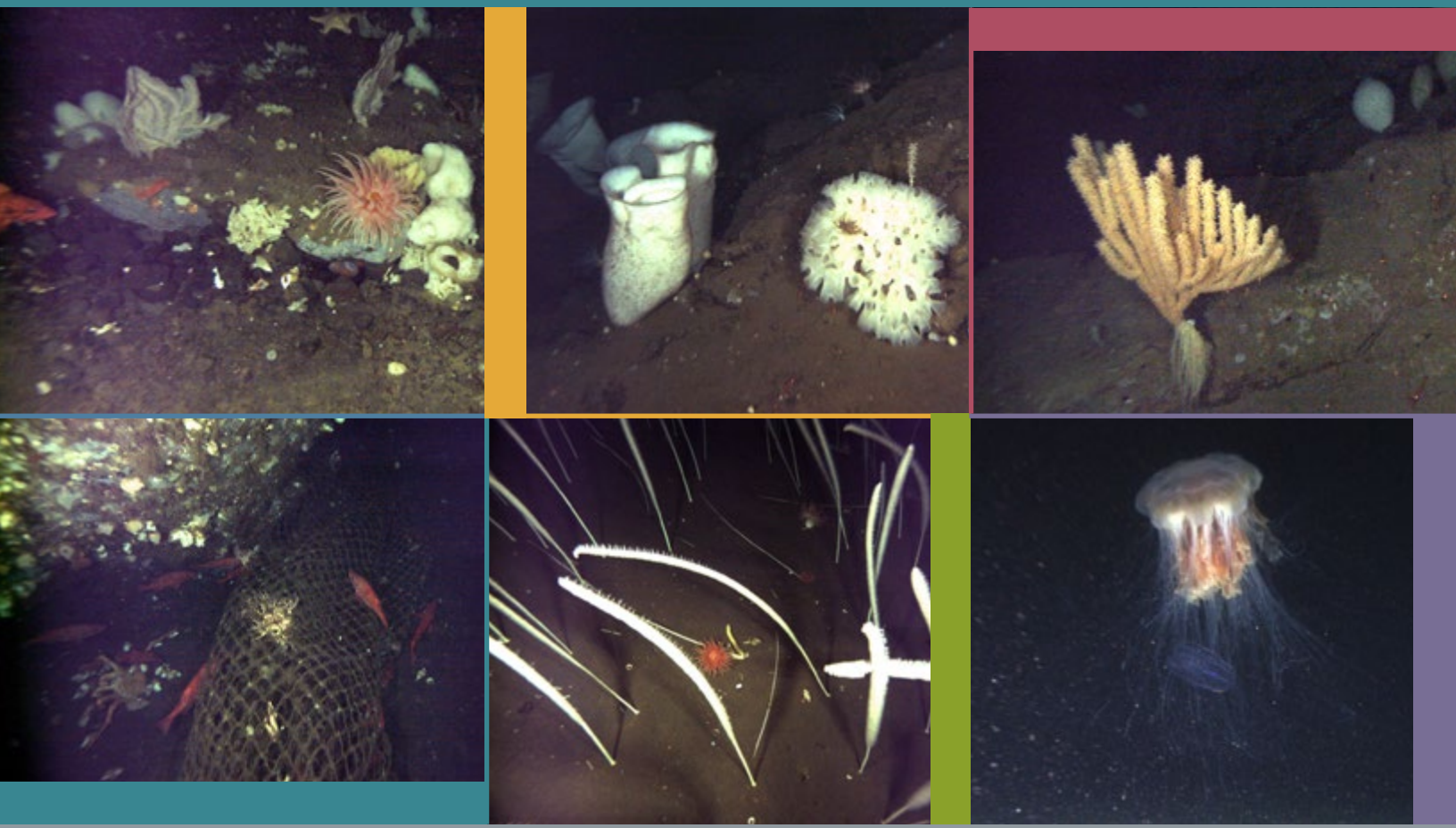
NOAA Technical Memorandum NMFS-AFSC-313
doi:10.7289/V5/TM-AFSC-313

Results of the 2014 Underwater Camera Survey of the Eastern Bering Slope and Outer Shelf

by
P. Goddard, R. Wilborn, C. Rooper, K. Williams, R. Towler,
M. Sigler, and P. Malecha



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

February 2016

NOAA Technical Memorandum NMFS

The National Marine Fisheries Service's Alaska Fisheries Science Center uses the NOAA Technical Memorandum series to issue informal scientific and technical publications when complete formal review and editorial processing are not appropriate or feasible. Documents within this series reflect sound professional work and may be referenced in the formal scientific and technical literature.

The NMFS-AFSC Technical Memorandum series of the Alaska Fisheries Science Center continues the NMFS-F/NWC series established in 1970 by the Northwest Fisheries Center. The NMFS-NWFSC series is currently used by the Northwest Fisheries Science Center.

This document should be cited as follows:

Goddard, P., R. Wilborn, C. Rooper, K. Williams, R. Towler, M. Sigler, and P. Malecha. 2016. Results of the 2014 underwater camera survey of the eastern Bering Slope and Outer Shelf. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-313, 304 p. http://dx.doi.org/10.7289/V5/TM-AFSC-313.

Document available: http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-313.pdf

Reference in this document to trade names does not imply endorsement by the National Marine Fisheries Service, NOAA.

NOAA Technical Memorandum NMFS-AFSC-313
doi:10.7289/V5/TM-AFSC-313

Results of the 2014 Underwater Camera Survey of the Eastern Bering Slope and Outer Shelf

by
P. Goddard, R. Wilborn, C. Rooper, K. Williams, R. Towler,
M. Sigler, and P. Malecha

Alaska Fisheries Science Center
Resource Assessment and Conservation Engineering Division
7600 Sand Point Way NE
Seattle, WA 98115

www.afsc.noaa.gov

U.S. DEPARTMENT OF COMMERCE
Penny. S. Pritzker, Secretary
National Oceanic and Atmospheric Administration
Kathryn D. Sullivan, Under Secretary and Administrator
National Marine Fisheries Service
Eileen Sobeck, Assistant Administrator for Fisheries

February 2016

This document is available to the public through:

National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161

www.ntis.gov

ABSTRACT

The results of the 2014 Underwater Camera Survey of the Eastern Bering Sea slope and outer shelf are presented here. The 2014 survey was the first comprehensive underwater camera survey of coral and sponge on the Bering Sea slope and outer shelf conducted by the National Marine Fisheries Service. Two-hundred fifty transects were successfully completed during the survey, which extended north from Bering Canyon to Pervenets Canyon. Transects were randomly selected between Unalaska Island and Pervenets Canyon. Each transect was assigned to one of eight geographical regions. Demersal populations of corals, sponges, sea whips, fishes, and crabs were sampled by drifting a stereo drop camera for 15 minutes at each transect. Survey results presented in this report include fish and crab composition and density, coral, sponge and sea whip density and height, and substrate composition for each transect. The Appendix lists start position, distance towed, swath, mean depth, and mean temperature for each transect completed.

CONTENTS

ABSTRACT . . . iii
INTRODUCTION . . . 1
METHODS . . . 1
Study Area . . . 1
Survey Design and Field Sampling . . . 2
Image Analysis . . . 3
RESULTS . . . 4
ACKNOWLEDGMENTS . . . 5
CITATIONS . . . 7
SITE SUMMARY: Bering Canyon . . . 16
SITE SUMMARY: Bering Canyon to Pribilof Canyon . . . 29
SITE SUMMARY: Pribilof Canyon . . . 50
SITE SUMMARY: Pribilof Canyon . . . 52
SITE SUMMARY: Pribilof Canyon to Zhemchug Canyon . . . 90
SITE SUMMARY: Zhemchug Canyon . . . 166
SITE SUMMARY: Zhemchug Canyon to Pervenets Canyon . . . 193
SITE SUMMARY: Pervenets Canyon . . . 211
SITE SUMMARY: Outer Shelf . . . 226
APPENDIX . . . 297
Appendix Table A1. -- Eastern Bering Sea Canyons and Outer Shelf 2014 camera survey transect data. . . . 297

FIGURES

Figure 1. -- Eastern Bering Sea shelf, slope, and canyons. . . . 8
Figure 2. -- Eastern Bering Sea slope and outer shelf 2014 camera survey transect locations. . 9
Figure 3. -- Eastern Bering Sea slope and outer shelf 2014 camera survey, evidence of commercial fishing. . . . 10
Figure 4. -- Survey transect locations, Bering Canyon. . . . 15
Figure 5. -- Sea whip distribution, Bering Canyon. . . . 17
Figure 6. -- Sponge distribution, Bering Canyon. . . . 17
Figure 7. -- Survey transect locations, Bering Canyon to Pribilof Canyon. . . . 28
Figure 8. -- Sea whip distribution, Bering Canyon to Pribilof Canyon. . . . 30
Figure 9. -- Sponge distribution, Bering Canyon to Pribilof Canyon. . . . 30
Figure 10. -- Survey transect locations, Pribilof Canyon. . . . 49
Figure 11. -- Sea whip distribution, Bering Canyon to Pribilof Canyon. . . . 53
Figure 12. -- Coral distribution, Bering Canyon to Pribilof Canyon. . . . 53
Figure 13. -- Sponge distribution, Bering Canyon to Pribilof Canyon. . . . 53
Figure 14. -- Survey transect locations, Pribilof Canyon to Zhemchug Canyon. . . . 89
Figure 15. -- Sea whip distribution, Pribilof Canyon to Zhemchug Canyon. . . . 93
Figure 16. -- Coral distribution, Pribilof Canyon to Zhemchug Canyon. . . . 93
Figure 17. -- Sponge distribution, Pribilof Canyon to Zhemchug Canyon. . . . 93
Figure 18. -- Survey transect locations, Zhemchug Canyon. . . . 162
Figure 19. -- Sea whip distribution, Zhemchug Canyon. . . . 166
Figure 20. -- Coral distribution, Zhemchug Canyon. . . . 166
Figure 21. -- Sponge distribution, Zhemchug Canyon. . . . 166
Figure 22. -- Survey transect locations, Zhemchug to Pervenets Canyon. . . . 192
Figure 23. -- Sea whip distribution, Zhemchug Canyon to Pervenets Canyon. . . . 194
Figure 24. -- Sponge distribution, Zhemchug Canyon to Pervenets Canyon. . . . 194
Figure 25. -- Survey transect locations, Pervenets Canyon. . . . 210
Figure 26. -- Sea whip distribution, Pervenets Canyon. . . . 212
Figure 27. -- Sponge distribution, Pervenets Canyon. . . . 212
Figure 28. -- Survey transect locations, Outer Shelf. . . . 225
Figure 29. -- Sea whip distribution, Outer Shelf. . . . 229
Figure 30. -- Coral distribution, Outer Shelf.. . . . 229
Figure 31. -- Sponge distribution, Outer Shelf. . . . 229

TABLES

Table 1. -- Eastern Bering Sea slope and outer shelf 2014 camera survey, examples of substrate classifications. . . . 11

Table 2. -- Eastern Bering Sea slope and outer shelf 2014 camera survey fish and crab by species or grouping and summary of occurrences and percent occurrences for all 250 transects. . . . 12

Table 3. -- Eastern Bering Sea slope and outer shelf 2014 camera survey coral, sponge, and sea whip classification, number of occurrences, and percent occurrences for all regions sampled. . . . 13

Table 4. -- Eastern Bering Sea slope and outer shelf 2014 camera survey, evidence of commercial fishing. . . . 14

Table 5. -- Summary of substrates identified at transects ($n = 10$) in Bering Canyon. . . . 16

Table 6. -- Summary of fishes and crabs identified at transects ($n = 10$) in Bering Canyon. . . . 16

Table 7. -- Summary of corals, sponges, and sea whips identified at transects ($n = 10$) in Bering Canyon. . . . 17

Table 8. -- Summary of corals, sponges, and sea whips taxa mean heights measured in Bering Canyon. . . . 17

Table 9. -- Summary of substrates observed at transects ($n = 18$) between Bering Canyon and Pribilof Canyon. . . . 29

Table 10. -- Summary of fishes and crabs identified at transects ($n = 18$) between Bering Canyon and Pribilof Canyon. . . . 29

Table 11. -- Summary of coral, sponge, and sea whip taxa identified at transects ($n = 18$) between Bering Canyon and Pribilof Canyon. . . . 30

Table 12. -- Summary of coral, sponge, and sea whip heights from transects completed between Bering Canyon and Pribilof Canyon. . . . 30

Table 13. -- Summary of substrates observed at transects ($n = 35$) in Pribilof Canyon. . . . 50

Table 14. -- Summary of fishes and crabs identified at transects ($n = 35$) in Pribilof Canyon. . . . 51

Table 15. -- Summary of coral, sponge, and sea whip taxa identified at transects ($n = 35$) in Pribilof Canyon. . . . 52

Table 16. -- Summary of coral, sponge, and sea whip mean heights from transects completed in Pribilof Canyon. . . . 52

Table 17. -- Summary of substrates observed at transects ($n = 68$) between Pribilof Canyon and Zhemchug Canyon. . . . 90

Table 18. -- Summary of fishes and crabs identified at transects ($n = 68$) between Pribilof Canyon and Zhemchug Canyon. . . . 91

Table 19. -- Summary of coral, sponge, and sea whip taxa identified at transects ($n = 68$) between Pribilof Canyon and Zhemchug Canyon. . . . 92

Table 20. -- Summary of coral, sponge, and sea whip mean height from transects completed between Pribilof Canyon and Zhemchug Canyon. . . . 92

Table 21. -- Summary of substrates observed at transects ($n = 25$) in Zhemchug Canyon. . . . 163

Table 22. -- Summary of fishes and crabs identified at transects ($n = 25$) in Zhemchug Canyon. . . . 164

Table 23. -- Summary of coral, sponge, and sea whip taxa identified at transects ($n = 25$) in Zhemchug Canyon. . . . 165

Table 24. -- Summary of coral, sponge, and sea whip mean height from transects completed in Zhemchug Canyon. . . . 165

Table 25. -- Summary of substrates observed at transects ($n = 15$) between Zhemchug Canyon and Pervenets Canyon. . . . 193

TABLES continued

Table 26. -- Summary of fishes and crabs identified at transects ($n = 15$) between Zhemchug Canyon and Pervenets Canyon. 193

Table 27. -- Summary of coral, sponge, and sea whip taxa identified at transects ($n = 15$) between Zhemchug Canyon and Pervenets Canyon. 194

Table 28. -- Summary of coral, sponge, and sea whip mean height from transects completed between Zhemchug Canyon and Pervenets Canyon. 194

Table 29. -- Summary of substrates observed at transects ($n = 12$) in Pervenets Canyon. 211

Table 30. -- Summary of fishes and crabs identified at transects ($n = 12$) in Pervenets Canyon. 211

Table 31. -- Summary of coral, sponge, and sea whip taxa observed at transects ($n = 12$) in Pervenets Canyon. 212

Table 32. -- Summary of coral, sponge, and sea whip mean height collected from transects in Pervenets Canyon. 212

Table 33. -- Summary of substrates identified at transects ($n = 67$) on the outer shelf. 226

Table 34. -- Summary of fishes and crabs identified at transects ($n = 67$) on the outer shelf. . . 227

Table 35. -- Summary of coral, sponge, and sea whip taxa identified at transects ($n = 67$) on the outer shelf. 227

Table 36. -- Summary of coral, sponge, and sea whip mean height data from transects on the outer shelf. 228

INTRODUCTION

The fish and crab resources of the eastern Bering Sea slope and outer shelf are widely utilized by commercial fisheries in Alaska. It is an area of enhanced primary and secondary productivity (the "Bering Sea Greenbelt"). Physical processes at the shelf break enhance productivity, attracting large numbers of fishes, seabirds, and marine mammals (Springer et al. 1996). About 40% of U.S. commercial fisheries catch originates from the eastern Bering Sea, including the slope and outer shelf. The eastern Bering Sea slope contains five major canyons each of which incises the outer shelf (Fig. 1). In 2012, the North Pacific Fishery Management Council (NPFMC) received testimony from environmental organizations suggesting management measures to provide Essential Fish Habitat (EFH) protection to coral, sponge and other benthic habitat of fish and crab species for two of the largest eastern Bering Sea canyons (Pribilof and Zhemchug).

Based on this testimony, the NPFMC requested the Alaska Fisheries Science Center (AFSC) conduct an analysis to determine whether or not the Bering Sea canyons are unique coral and sponge habitats and if the fish and invertebrate assemblages make the canyons vulnerable to the effects of commercial fishing. An analysis of existing data was conducted and presented to the NPFMC in 2013 (Sigler et al. 2013; Sigler et al. 2015). The conclusions of that analysis were that although there are some physical characteristics that distinguish the canyons from the surrounding slope and outer shelf areas, there are no unique features about the biology that distinguish Pribilof or Zhemchug Canyons from the surrounding slope areas. The major variables structuring the biological communities on the eastern Bering Sea slope and outer shelf are depth and latitude (Sigler et al. 2015, Hoff et al. in review).

As part of the follow-up to the 2013 analyses, the NPFMC requested that the AFSC conduct an underwater camera survey at transects along the eastern Bering Sea slope and outer shelf. This survey was designed to verify predictions of benthic invertebrate presence or absence, assess species associations between fishes and invertebrates, and document any evidence of fishing activity that was observed. The objective of this report is to present detailed data collected from the underwater camera survey, as well as images and summaries from each transect.

METHODS

Study Area

The eastern Bering Sea is dominated by a broad, shallow continental shelf that stretches east to west from the Alaska mainland to the shelf break roughly 700 km away (Fig. 1). The eastern Bering Sea shelf is commonly divided into three domains based on bathymetry and oceanographic fronts: the inner shelf (0 to 50 m), the middle shelf (50 to 100 m) and the outer shelf (100 to 180 m) (Coachman 1986). The shelf break is typically at 180 to 200 m depth, except at the northern edge of Bering Canyon, where the shelf break is at 500 m (Sigler et al. 2015). The eastern Bering Sea slope and outer shelf are made up of five major canyons (Bering Canyon, Pribilof Canyon, Zhemchug Canyon, Pervenets Canyon and Navarin Canyon) with an inter-canyon area between each (Fig. 1). There are also multiple smaller canyons along the shelf break, but none incise the shelf to the degree of the five largest. This report covers seven

regions (canyon and between canyons) along the continental slope and the outer region of the eastern Bering Sea shelf.

Survey Design and Field Sampling

Two-hundred fifty of 300 randomly selected transects were successfully completed from 8 August to 6 September 2014 (Fig. 2; Appendix A). Due to poor weather and time constraints the majority of unsampled transects were north of Zhemchug Canyon. Transects were chosen on a regularly-spaced grid overlayed on the eastern Bering Sea outer shelf and slope with 100 m by 100 m sides. Random transects were chosen in two stages. For the first stage, 10 transects were chosen randomly from each of the nine individual canyon and between canyon areas (n = 90) to ensure that there was adequate spatial coverage of the entire area. For the second stage, 210 transects were randomly chosen throughout the nine slope areas and the outer shelf based on the probability of coral presence from the bottom-trawl model of coral distribution (Sigler et al. 2015). Thus, areas with a higher probability of coral presence (such as Pribilof Canyon and the adjacent area to the north) received more allocated transects (Fig. 2).

A stereo drop camera system (Williams et al. 2010) was used as the primary sampling tool. The system is designed to be towed or drifted continuously along a linear transect at or near the seafloor. Two machine-vision cameras spaced approximately 30 cm apart in underwater housings were connected via ethernet cables to a computer also in an underwater housing. One of the paired cameras recorded 1.45 megapixel monochromatic still images, while the other camera collected 1.73 megapixel color still images. Lighting was provided by four strobe lights constructed of four Bridgelux® BXRA LED arrays capable of producing 1,300 lumens at 10.4 W. The computer, cameras, and lights were powered by a 28 V NiMH battery pack. Synchronous images were collected from each of the cameras at a frequency of one image per second and written to a hard drive on the computer. Additionally, images were taken (but not written to the hard drive) from the monochrome camera at a rate of four images per second. These images were viewed in real time on a monitor at the surface. This allowed the height of the camera to be actively controlled to keep it just above the seafloor using a quick response electric winch. A 3/16-inch diameter coaxial cable provided the video connection from the drop camera system to the winch at the surface and allowed image viewing in real time.

At each occupied transect, the camera was deployed at the center of the grid cell and lowered to the seafloor. Once seafloor contact was made, the drop camera was drifted along the bottom for 15 minutes. During each deployment, the drop camera system was drifted through the water column in the direction of the prevailing current a speed of 0.48 to 3.34 km/hr (0.26 to 1.8 knots) approximately 1 to 2 m above the substrate with the cameras pointed slightly downward at an angle of approximately 35° off parallel to the seafloor. The research vessel's global positioning system (GPS) was used to determine the position of the camera throughout the deployment. A concentrated effort was made to keep the deployment cable as near to vertical as possible. The distances traveled during deployments ranged from 27 m to 839 m (mean = 362 m, SE = 8.8). Area (m^2) was calculated by multiplying distance the camera drifted (m) by swath of the camera field of view (m).

Image Analysis

Each image pair collected during each deployment was viewed using stereo image processing software developed in the Python programming language (Kresimir Williams, AFSC-RACE Division, unpublished software). Substrates were classified by a commonly used seafloor substratum classification scheme (Stein et al. 1992, Yoklavich et al. 2000). The classification consists of a two-letter coding of substratum type denoting a primary substratum with > 50% coverage of the seafloor bottom and a secondary substratum with 20% - 49% coverage of the seafloor (Table 1). There were eight identified substratum types: mud/silt (M, distinguished from sand by presence of silt clouds), sand (S, grains often visible, no silt clouds), gravel (G, diameter < 6.5 cm), mixed coarse material (MC), cobble (C, 6.5 < diameter < 25.5 cm), boulder (B, diameter > 25.5 cm), exposed low relief bedrock (R), and exposed high relief bedrock, and rock ridges (K). By this classification, a section of seafloor covered primarily in cobble, but with boulders over more than 20% of the surface, would receive the substratum code Cobble.boulder (Cb) with the secondary substratum indicated by the lower-case letter. Substratum codes were changed if a substratum encompassed more than 10 consecutive images.

All fishes and commercially important crabs were identified to the lowest taxonomic level possible and counted for each image pair. Species identification for fishes was based on Butler (2012), Mecklenburg (2002), and J. W. Orr (AFSC pers. comm.). Structure-forming invertebrates (corals, sponges, and sea whips) were also identified to the lowest possible taxonomic level and counted for each image pair. Species identification for corals and sponges were based on Cairns (2011), Stone et al. (2011), Stone (2014), R. Stone (AFSC pers. comm.), Taylor et al. (2013), and Wing and Barnard (2004). Demospongiae were too numerous to count on four transects. A random subsample of 135 paired frames was obtained and all individuals were counted. Sponges less than 10 cm in height were difficult to discern from other small white or yellow items on the seafloor, so these were not included in the counts or analyses. Individual taxon densities were calculated by dividing counts by area swept (distance observed x path width observed).

Vertical habitat was defined as structure-forming invertebrates such as corals, sponges, and sea whips. Heights were obtained when the base and tip of the invertebrate could be clearly identified in both images. Sea whips with bent tips were measured to their highest point above the seafloor. For transects where sponge or sea whip counts exceeded 500, a random subsample of 135 paired images were selected to obtain approximately 200 height measurements.

Image analysis resulted in densities of fishes, crabs, and structure-forming invertebrates (no./m^2) for each of the 250 transects, fish lengths for each species that could be measured, heights of structure forming invertebrates and the proportions of each type of substrate found on the transect. Densities of individual taxa were calculated by dividing counts by the area swept (distance observed x path width observed). The image analysis software provided a range, in centimeters, from the camera to each individual target that was identified in an image pair. The path width was estimated from the median of this range for each transect. The median range of all objects counted on a transect was assumed to be the distance from the camera where 100% of fishes and invertebrates were detected for that transect. The viewing angle for each camera is known (and fixed by the camera lens). Using the median range and the known viewing angle, a horizontal line in front of the camera can be calculated using formulae for sizing

triangle components. Since we have an angle (viewing angle) and the adjacent side of a triangle (range) for each camera, the length of the opposite side can be calculated. This opposite side is the viewing path width at the median range for each transect. This width was calculated for each transect and used as the path width in density estimation. The mean path width across all transects was 3.08 m (SE = 0.05), with a minimum of 1.55 m and a maximum of 5.51 m for any individual transect.

RESULTS

For the purpose of this report, transects were grouped into eight regions: Bering Canyon, Bering Canyon to Pribilof Canyon, Pribilof Canyon, Pribilof Canyon to Zhemchug Canyon, Zhemchug Canyon, Zhemchug Canyon to Pervenets Canyon, Pervenets Canyon, and Outer Shelf. Two-hundred fifty transects were successfully occupied between Bering Canyon and Pervenets Canyon. Depths ranged from 91 m to 756 m, with the shallowest (90.6 m) transect occurring in Pribilof Canyon and the deepest (776.8 m) between Pribilof Canyon and Zhemchug Canyon. Thirty-six different fish and crab species or taxonomic groupings are presented in this report (Table 2). These were dominated by eelpouts (Zoarcidae) and *Chionoecetes* crabs. However, grenadiers (Macrouridae) and rockfishes (*Sebastes* sp., especially Pacific ocean perch, *S. alutus*) were also common. Most of the species that were found in high abundance tended to be small benthic dwelling fishes such as eelpouts, snailfishes (Liparidae), sculpins (Cottidae, Hemitripteridae, Psychrolutidae), and poachers (Agonidae). Vertical habitat consisted of over 70,000 structure-forming invertebrates (Table 3). These were comprised of about 53% Demospongiae and 38% sea whips. Only 2% (< 1,500 individuals) of the total invertebrates observed were corals.

Corals occurred on 32 of the 250 survey transects. They were identified into five taxonomic groups, including three families (Primnoidae, Plexauridae, and Isididae), and two genera (*Plumarella* sp. and *Swiftia* sp.). The most common corals were *Plumarella* sp. and *Swiftia* sp. The median depth at which coral occurred was 451 m (range = 201 – 770 m), much deeper than the median depth of samples (276 m). Corals occurred at 50% of the survey transects in Pribilof Canyon and about 18% of the transects in the area between Pribilof and Zhemchug Canyons. Corals were present at one transect on the Outer Shelf and one transect in Zhemchug Canyon.

Sponges occurred on 113 of the 250 survey transects. They were identified into three classes: Hexactinellida, Demospongiae, and Calcarea. The median depth at which sponges occurred was 311 m, and they covered almost the entire depth range of sampling from 111 m to 781 m. Sponges were widely distributed and occurred in all of the sampled regions.

Sea whips (Pennatulacea) were also widely distributed both in terms of depth and region. They occurred at depths from 91 m to 700 m (median = 266 m) at 105 of the 250 transects surveyed. At least two different species of sea whip were observed, *Halipteris willemoesi* and an unidentified *Halipteris* species. Sea whips occurred in all regions.

Thirty-five different substrate combinations were identified. Substrate composition for each transect is presented in the site summaries as "Primary.secondary" (i.e., Sand.mud) unless primary and secondary substrates are identical (i.e., Sand).

Evidence of fishing was identified in 32 transects. Trawl gear, longline gear, and trawl tracks were recorded (Table 4; Fig. 3).

Survey results are presented in eight sections according geographical regions. Each section contains a map of transect locations and coral, sponge and sea whip distributions as well as summary tables of species composition, density, and height data. For each transect, we provide date, location (decimal degrees), area (m^2), mean depth (m), mean temperature (°C), fish and crab composition; coral, sponge, and sea whip density and height; substrate composition; images; and a summary description.

ACKNOWLEDGMENTS

Recognition and appreciation are extended to Tim Cosgrove, Landon Mavar, Al Mavar and Gordy Mendez of the FV *Vesteraalen*. Their cooperation, expertise, and goodwill made this survey possible. Appreciation is also extended to Jerry Hoff, Jay Orr, Duane Stevenson and Bob Stone of the AFSC, and Steve MacLean of the NPFMC. Finally, appreciation is extended to Rebecca White for graphics support, and Kim Rand, Mike Levine, Denise McKelvey, and Jennifer Cahalan for their technical support, comments, and suggestions.

Funding for this project was provided by the NMFS Cooperative Research Program, the AFSC Habitat and Ecological Processes Research Program, and NOAA's Deep Sea Research and Technology Program.

CITATIONS

Butler, J.L., M.S. Love, T.E Laidig. 2012. A guide to the rockfish, thornyheads, and scorpionfishes of the northeast Pacific. University of California Press, Berkeley, CA, 185 p.

Cairns, S.D. 2011. A Revision of the Primnoidae (Octocorallia: Alcyonacea) from the Aleutian Islands and Bering Sea. Smithsonian Contributions to Zoology, 634: 1-55. doi:10.5479/si.00810282.634.

Coachman, L.K. 1986. Circulation, water masses and fluxes on the southeastern Bering Sea shelf. Cont. Shelf Res. 5:23-108.

Hoff, G.R. In review. Biodiversity along the Eastern Bering Sea Slope from Trawl Survey Data. Submitted to Marine Biodiversity.

Karl, H.A., P.R. Carlson, J.V. Gardner. 1996. Aleutian Basin of the Bering Sea: Styles of sedimentation and canyon development. *In* Gardner, J.V, M.E Field, D.C. Twichell, Geology of the United States seafloor: the view from GLORIA. Press Syndicate of the University of Chicago, Chicago IL.

Mecklenburg, C.W., T.A. Mecklenburg, L.K Thorsteinson. 2002. Fishes of Alaska. American Fisheries Society, Bethesda, MD. xxxvii + 1,037 pp. + 40 plates.

Sigler, M.F., C.N. Rooper, G.R. Hoff, R.P. Stone, R.A. McConnaughey, T.K. Wilderbuer, 2013. Are Bering Sea canyons unique habitats within the eastern Bering Sea? Report to North Pacific Fishery Management Council. Available at http://www.npfmc.org/wp-content/PDFdocuments/conservation_issues/BSHC/BeringSeaCanyons_a_513.pdf.

Sigler, M.F., C.N. Rooper, G.R. Hoff, R.P. Stone, R.A. McConnaughey, T.K Wilderbuer. 2015. Faunal features of submarine canyons on the eastern Bering Sea slope. Mar. Ecol. Prog. Ser. 526:21-40.

Springer, A.M., C.P. McRoy, M.V. Flint. 1996. The Bering Sea Green Belt: shelf-edge processes and ecosystem production. Fish. Oceanogr., 5:205–223.

Stein, D.L., B.N. Tissot, M.A. Hixon, W. Barss. 1992. Fish-habitat associations on a deep reef at the edge of the Oregon continental shelf. Fish. Bull., U.S. 90:540–551.

Stone, R.P. 2014. The ecology of deep-sea coral and sponge habitats of the central Aleutian Islands of Alaska. U.S. Dep. Commer., NOAA Professional Paper NMFS 16, 52 p.

Stone, R.P., H. Lehnert, H. Reiswig, 2011. A guide to the deep-water sponges of the Aleutian Island Archipelago. U.S. Dep. Commer., NOAA Professional Paper NMFS 12, 187 p.

Taylor, M.L., S.D. Cairns, D.J. Agnew, A.D. Rogers. 2013. A revision of the genus *Thouarella* Gray, 1870 (Octocorallia: Primnoidae), including an illustrated dichotomous key, a new species description, and comments on *Plumarella* Gray, 1870 and *Dasystenella*, Versluys, 1906. Zootaxa, 3602(1): 1-105.

Williams, K., C.N. Rooper, R. Towler. 2010. Use of stereo camera systems for assessment of rockfish abundance in untrawlable areas and for recording pollock behavior during midwater trawls. Fish. Bull., U.S. 108:352-362.

Wing, B.L., D.R. Barnard. 2004. A field guide to Alaskan corals. U. S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-146, 67 p.

Yoklavich, M.M., H.G. Greene, G.M. Cailliet, D.E. Sullivan, R.N. Lea, M.S. Love. 2000. Habitat associations of deep-water rockfishes in a submarine canyon: an example of a natural refuge. Fish. Bull., U.S. 98:625–641.

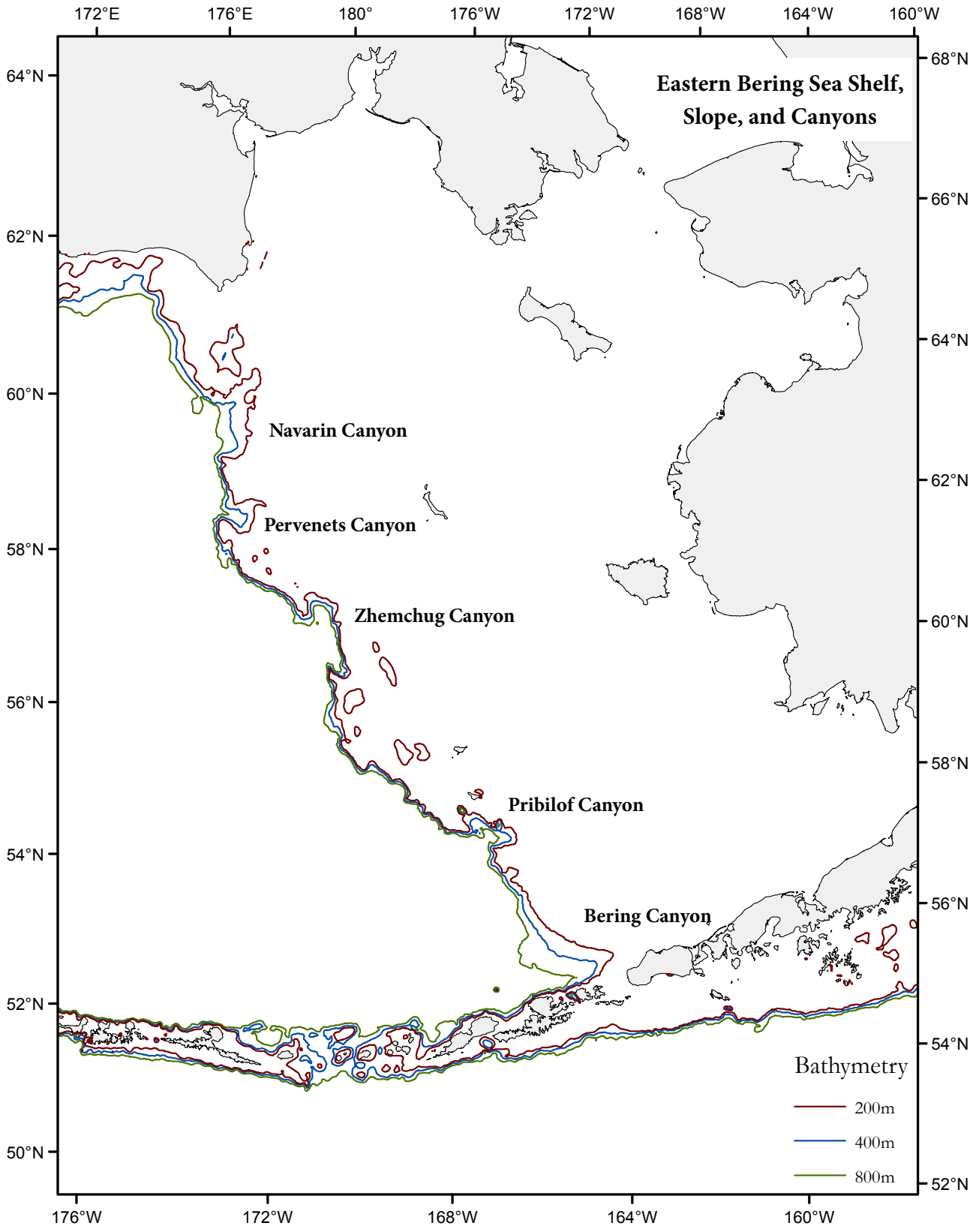


Figure 1. -- Eastern Bering Sea shelf, slope, and canyons.

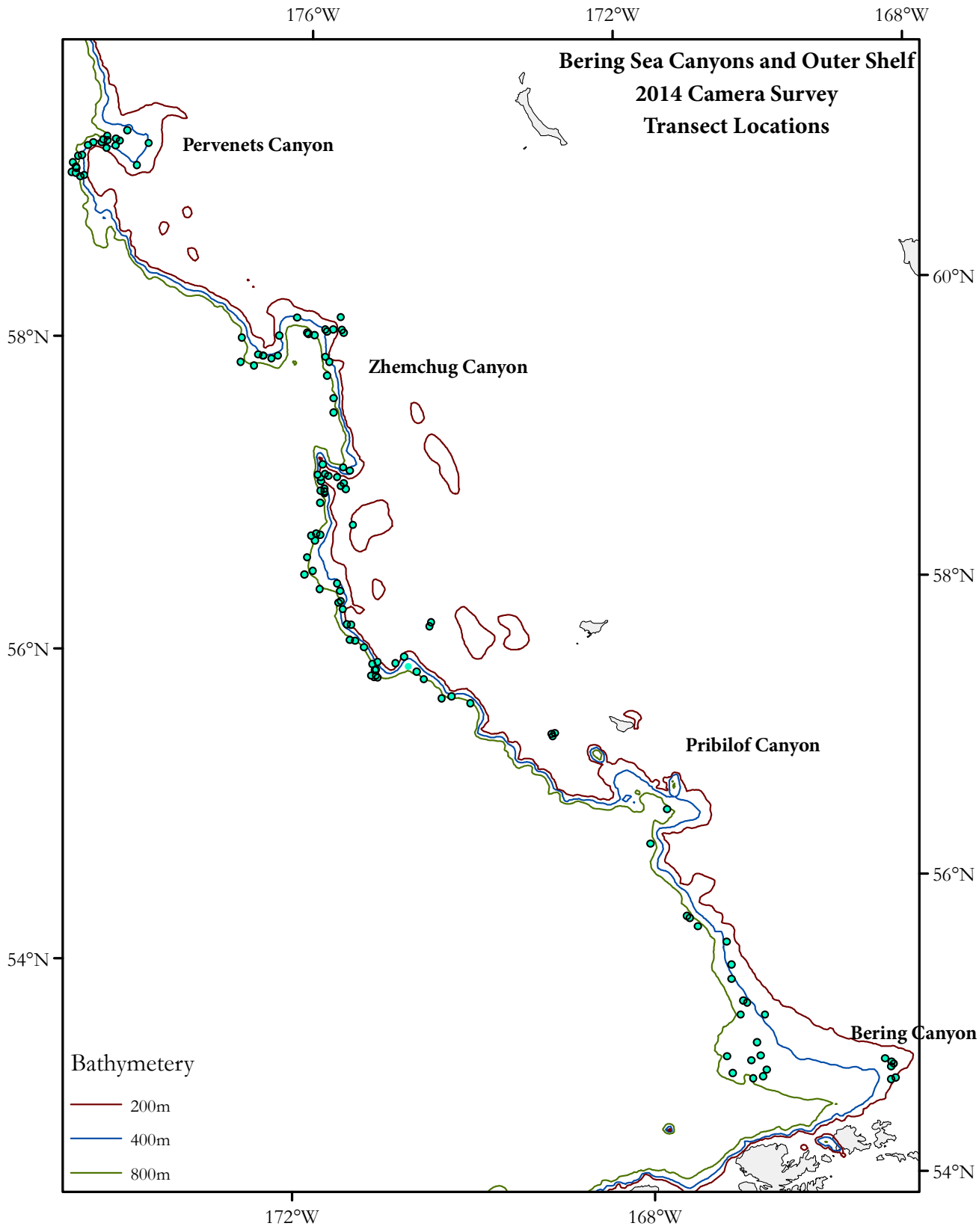


Figure 2. -- Eastern Bering Sea slope and outer shelf 2014 camera survey transect locations.

Figure 3. -- Eastern Bering Sea slope and outer shelf 2014 camera survey, evidence of commercial fishing.

Table 1. -- Eastern Bering Sea slope and outer shelf 2014 camera survey, examples of substrate classifications.

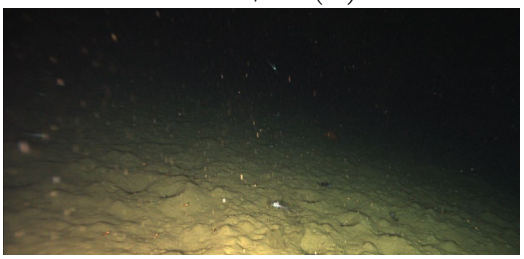
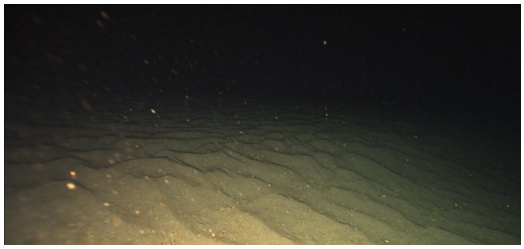
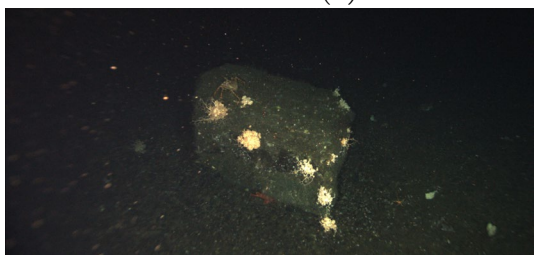
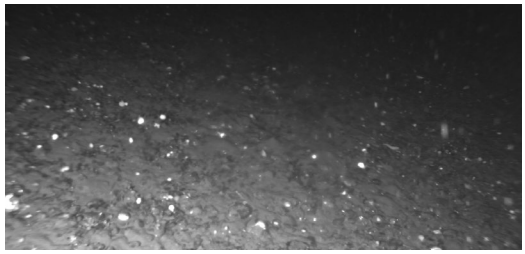
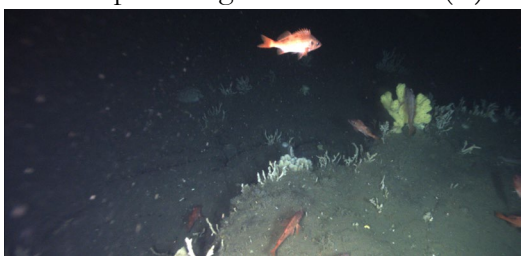
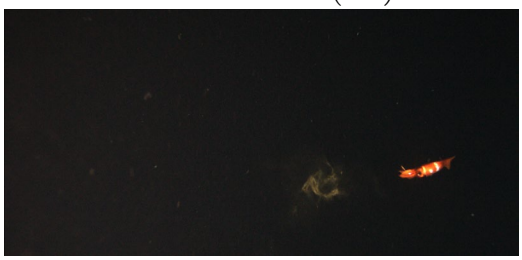
Mud/silt (M) 	Cobble (C)
Sand (S) 	Boulder (B) 
Gravel (G) 	Exposed low-relief bedrock (R)
Mixed coarse (C) 	Exposed high-relief bedrock (K) 
Off bottom (OB) 	

Table 2. -- Eastern Bering Sea slope and outer shelf 2014 camera survey fish and crab by species or grouping and summary of occurrences and percent occurrences for all 250 transects.

Species/Grouping	Number of occurrences	Percent of occurrences
Eelpout unid. (Zoarcidae)	2,155	16%
Chionoecetes sp.	2,068	16%
Popeye grenadier (*Coryphaenoides cinereus*)	1,481	11%
Pacific ocean perch (*Sebastes alutus*)	1,225	9%
Sculpin unid. (Cottidea, Hemitripteridae, Psychrolutidae)	948	7%
Golden king crab (*Lithodes aequispinus*)	746	6%
Snailfish unid. (Liparidae)	613	5%
Poacher unid. (Agonidae)	600	5%
Flatfish unid. (Pleuronectidae)	531	4%
Roundfish unid.	466	4%
Giant grenadier (*Albatrossia pectoralis*)	370	3%
Shortspine thornyhead (*Sebastolobus alascanus*)	281	2%
Northern rockfish (*Sebastes polyspinis*)	226	2%
Grenadier unid. (Macrouridae)	217	2%
Rockfish unid. (*Sebastes* sp.)	213	2%
Skate unid. (*Bathyraja* sp.)	168	1%
Searcher unid. (*Bathymaster* sp.)	154	1%
Crab unid.	125	1%
Arrowtooth/Kamchatka flounder (*Atheresthes* sp.)	123	1%
Deepsea sole (*Embassichthys bathybius*)	76	1%
Walleye pollock (*Gadus chalcogrammus*)	72	1%
Rex sole (*Glyptocephalus zachirus*)	69	1%
Shortraker rockfish (*Sebastes borealis*)	61	<1%
Flathead sole (*Hippoglossoides elassodon*)	48	<1%
Pacific halibut (*Hippoglossus stenolepis*)	33	<1%
Harlequin rockfish (*Sebastes variegatus*)	31	<1%
King crab unid. (Lithodidae)	30	<1%
Pacific cod (*Gadus macrocephalus*)	27	<1%
Cod/pollock unid. (*Gadus* sp.)	15	<1%
Blackspotted rockfish (*Sebastes melanostictus*)	13	<1%
Greenland turbot (*Reinhardtius hippoglossoides*)	10	<1%
Sablefish (*Anoplopoma fimbria*)	8	<1%
Rougheye rockfish (*Sebastes aleutianus*)	4	<1%
Scarlet king crab (*Lithodes couesi*)	4	<1%
Atka mackerel (*Pleurogrammus monopterygius*)	2	<1%
Dusky rockfish (*Sebastes variabilis*)	2	<1%

Table 3. -- Eastern Bering Sea slope and outer shelf 2014 camera survey coral, sponge, and sea whip classification, number of occurrences, and percent occurrences for all regions sampled.

Species/Grouping	Number of occurrences	Percent of occurrences
Demospongiae	37,682	55%
Halipteris sp.	26,782	39%
Hexactinellida	1,952	3%
Plumarella sp.	811	1%
Swiftia sp.	537	1%
Isididae	69	<1%
Primnoidae	38	<1%
Calcarea	31	<1%
Porifera	27	<1%
Plexauridae	8	<1%
Soft coral (Alcyonacea)	5	<1%

Table 4. -- Eastern Bering Sea slope and outer shelf 2014 camera survey, evidence of commercial fishing.

Haul	Latitude	Longitude	Depth	Damaged sponges	Damaged corals	Damaged sea whips	Total sponge observed	Total coral observed	Total sea whips observed	Longline or crab gear observed	Trawl net observed	Trawl tracks observed
14	55.81	-168.72	143	0	0	0	0	0	0	No	No	Yes
28	56.07	-168.55	529	0	0	0	223	7	0	Yes	No	No
33	56.11	-168.20	149	0	0	0	0	0	0	No	No	Yes
35	56.13	-168.18	147	0	0	0	0	0	0	No	No	Yes
43	56.09	-168.82	714	0	0	0	17	1	0	Yes	No	No
46	56.31	-169.03	136	0	0	0	0	0	0	No	No	Yes
47	56.27	-169.09	141	0	0	0	0	0	0	No	No	Yes
76	55.99	-169.63	474	0	0	0	4	2	28	Yes	No	No
79	56.17	-170.00	117	0	0	6	0	0	29	No	No	Yes
88	55.97	-170.12	311	0	0	0	1,415	4	0	No	Yes	No
98	56.13	-170.84	629	0	0	0	2	0	2	Yes	No	No
105	56.39	-170.67	116	0	0	33	0	0	1,447	No	Yes	No
117	56.47	-171.49	285	0	0	0	1,024	2	0	Yes	No	No
139	56.88	-173.41	515	0	0	1	3	0	71	Yes	No	No
144	56.41	-170.39	111	0	0	0	0	0	20	No	No	Yes
174	57.85	-173.85	272	0	0	0	91	0	1	Yes	No	No
175	57.94	-173.89	241	0	0	0	9	0	0	Yes	No	No
179	58.11	-174.17	563	0	0	0	1	0	0	Yes	No	No
187	58.74	-174.47	148	0	0	0	0	0	0	No	No	Yes
200	58.32	-175.34	375	0	0	0	6	0	0	No	No	Yes
208	59.10	-178.41	371	5	0	0	5	0	16	Yes	No	No
216	59.38	-178.19	748	0	0	0	0	0	0	Yes	No	No
223	59.47	-177.96	392	0	0	0	22	0	4	No	No	Yes
225	59.26	-177.66	261	0	0	0	0	0	0	No	No	Yes
232	54.71	-165.68	271	0	0	1	0	0	6	No	No	Yes
233	54.70	-165.60	274	0	0	8	1	0	466	No	No	Yes
234	54.69	-165.56	277	0	0	0	0	0	0	No	No	Yes
238	55.29	-167.79	217	0	0	44	0	0	1,537	No	No	Yes
239	55.15	-167.68	278	0	0	1	0	0	543	No	No	Yes
240	55.05	-167.64	346	0	0	0	0	0	117	No	No	Yes
241	54.92	-167.45	394	0	0	0	0	0	27	No	No	Yes
242	54.91	-167.40	371	0	0	0	0	0	22	No	No	Yes

Ten transects were completed in Bering Canyon. Depths ranged from 168 m to 691 m. Seventeen taxa of fishes and crabs were identified (Table 6). Vertical habitat was dominated by *Halipteris* sp. (Table 7). Heights ranged from 5.1 cm to 75.0 cm (Table 8).

Bering Canyon

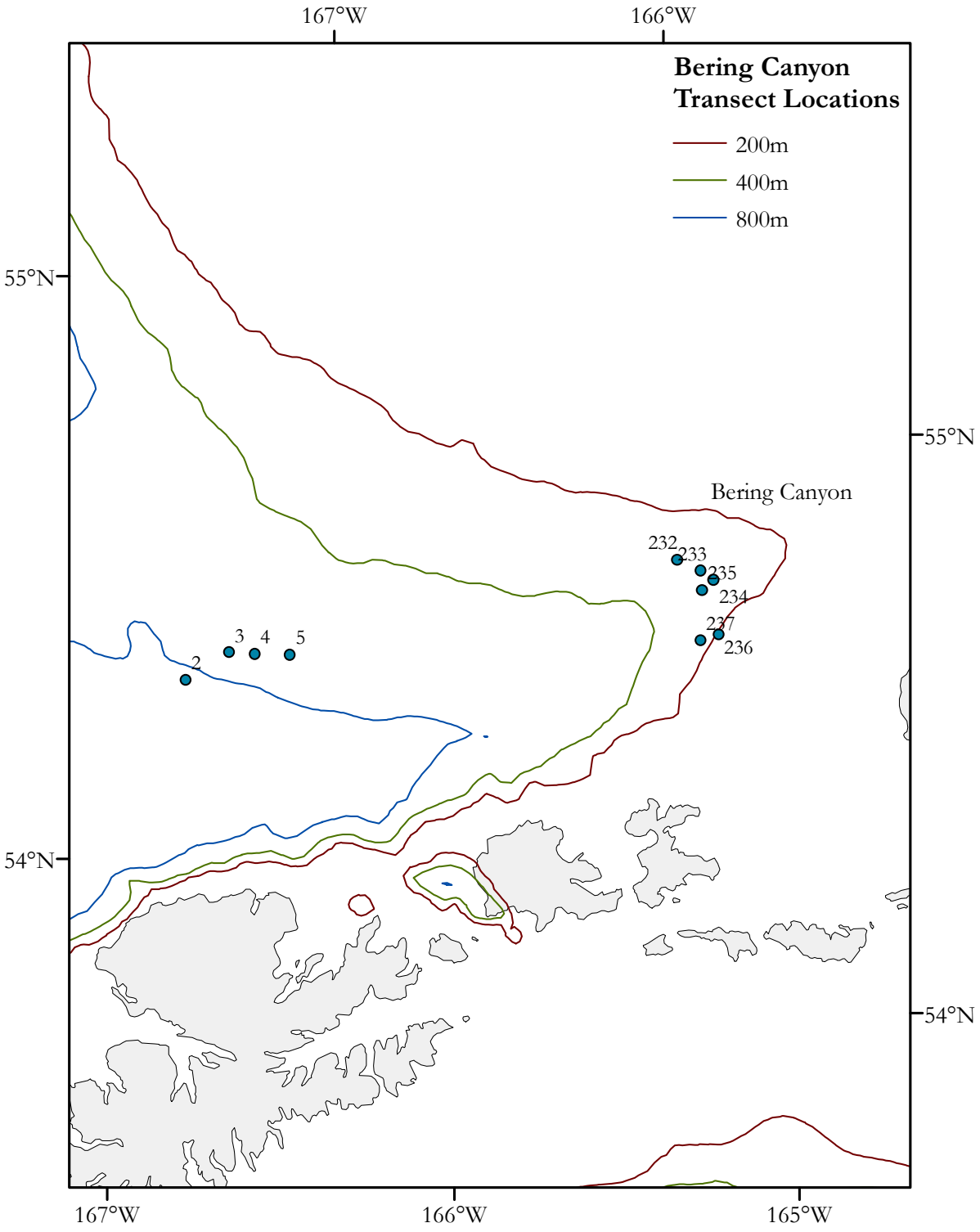


Figure 4. -- Survey transect locations, Bering Canyon.

SITE SUMMARY: Bering Canyon

Bering Canyon is the southernmost canyon in the Bering Sea. It has an estimated volume of 4,300 km^3 (Karl et al. 1996). Bering Canyon may be the longest submarine canyon in the world, extending 400 km across the outer shelf and slope (Karl et al. 1996). Unlike all of the other canyons in the Bering Sea, it consists of only one channel.

Sand was the primary substrate at 9 of the 10 transects (Table 5). Mud was the primary and secondary substrate at the remaining transect. For each of the transects in Bering Canyon the primary and secondary substrates were unchanging throughout the observations.

Eelpouts, snailfishes, giant grenadiers, and poachers comprised 68% of the fish and crab observations (Table 6). Two species of crab were identified, *Chionoecetes* sp. and golden king crab.

Vertical habitat primarily consisted of *Halipteris* sp., which only occurred at transects 232, 233, and 237 (Figs. 5-6). Ninety-six percent of the *Halipteris* occurred on a sandy substrate at Transect 233 where the mean depth was 271 m. Demospongiae were identified at five of the transects while Hexactinellida were only identified at two (Table 7, Fig. 6).

Table 5. -- Summary of substrates identified at transects (n = 10) in Bering Canyon.

Substrate	Depth range (m)	Number of transects with observed substrate	Percent of observations
Sand*	229 - 298	4	40%
Sand.mud	542 - 691	4	39%
Mud*	271 - 271	1	11%
Sand.gravel	168 - 168	1	11%

*Primary and secondary substrates were the same.

Table 6. -- Summary of fishes and crabs identified at transects (n = 10) in Bering Canyon.

Species/Grouping	Number of occurrences	Number of transects with occurrences	Mean transect depth range (m)	Mean density (individuals/m^2)
Eelpout unid.	49	7	542 - 691	<0.01
Snailfish unid.	46	4	271 - 691	0.01
Poacher unid.	35	9	271 - 691	<0.01
Giant grenadier	29	4	542 - 691	0.01
Rex sole	13	2	271 - 274	0.01
Roundfish unid.	12	3	542 - 691	<0.01
Flatfish unid.	9	4	229 - 298	<0.01
Shortspine thornyhead	8	4	542 - 691	<0.01
Pacific cod	4	2	229 - 274	<0.01
Arrowtooth/Kamchatka flounder	4	3	271 - 298	<0.01
Golden king crab	2	2	542 - 550	<0.01
Skate unid.	2	2	229 - 691	<0.01
Walleye pollock	2	2	271 - 298	<0.01
Chionoecetes sp.	2	1	550 - 550	<0.01
Pacific halibut	1	1	550 - 550	<0.01

SITE SUMMARY: Bering Canyon

Table 7. -- Summary of corals, sponges, and sea whips identified at transects (n = 10) in Bering Canyon.

Species/Grouping	Number of occurrences	Number of transects with occurrences	Mean transect depth range (m)	Mean density (individuals/m^2)
Halipteris sp.	463	2	271 - 274	0.28
Demospongiae	33	5	168 - 551	<0.01
Halipteris sp. (damaged)	10	3	229 - 274	<0.01
Hexactinellida	6	2	542 - 550	<0.01

**Halipteris* sp. (damaged) is not accounted for in the *Halipteris* sp. grouping.

Table 8. -- Summary of corals, sponges, and sea whips taxa mean heights measured in Bering Canyon.

Species/Grouping	Number measured	Mean height (cm)	Minimum height (cm)	Maximum height (cm)
Halipteris willemoesi	95	25.0	5.1	74.6
Demospongiae	4	25.4	12.6	45.1
Hexactinellida	1	13.4	13.4	13.4

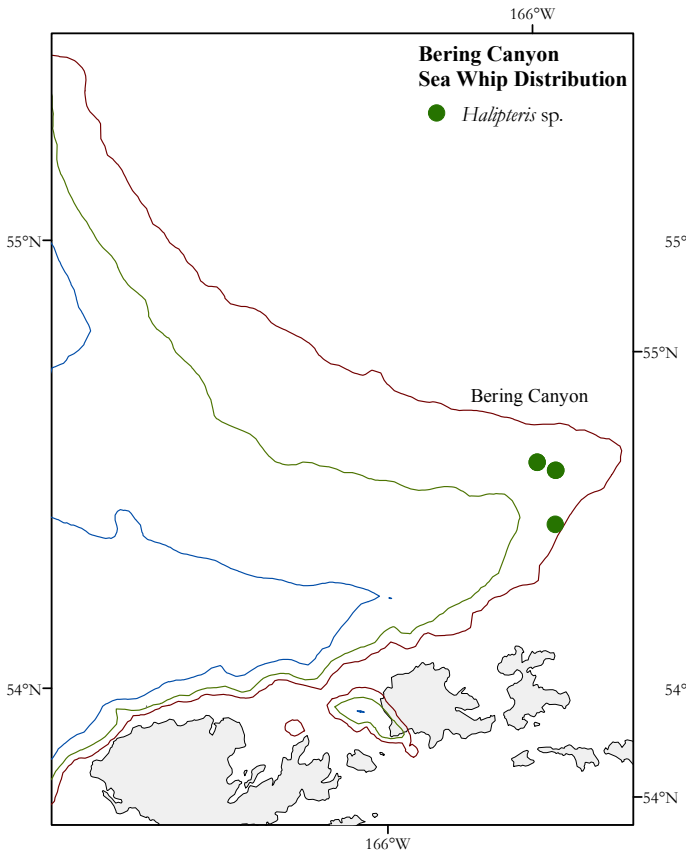


Figure 5. -- Sea whip distribution, Bering Canyon.

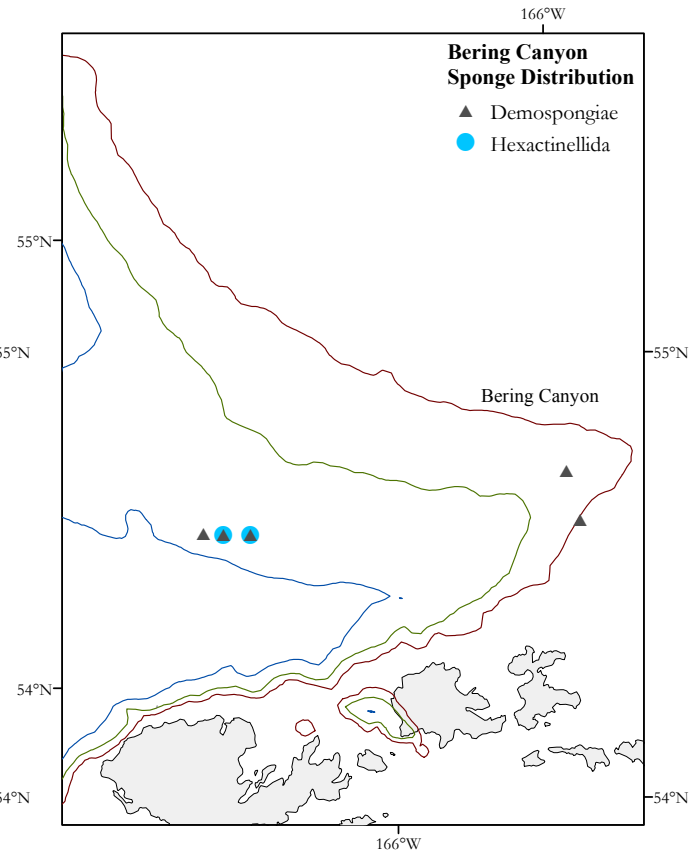
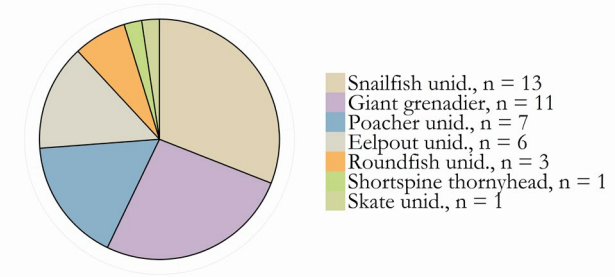
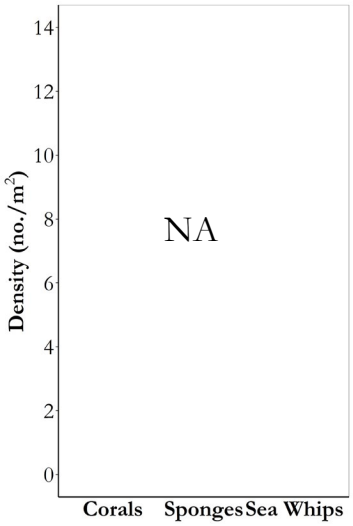


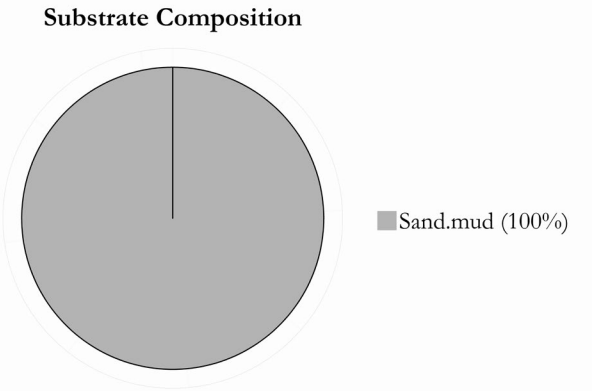
Figure 6. -- Sponge distribution, Bering Canyon.

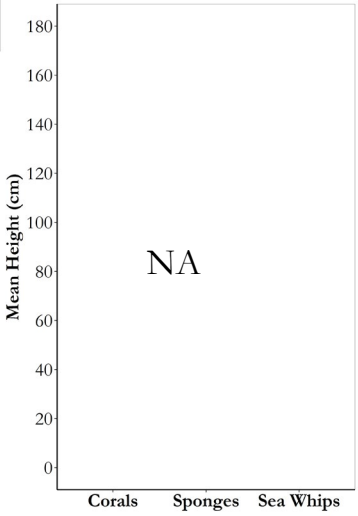
Area: Bering Canyon — Transect 2

Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/11/14	54.35	-167.06	702	691	NA









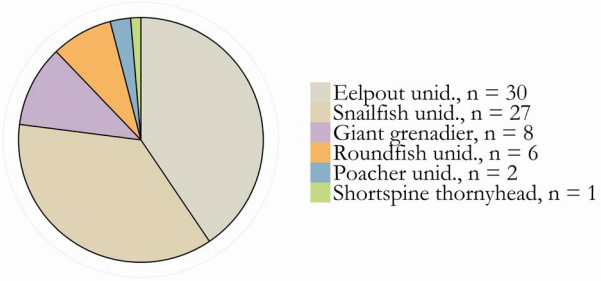
Images

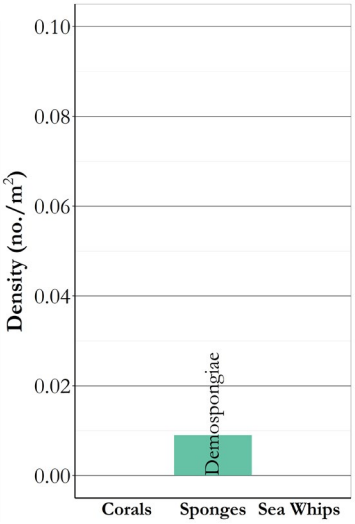
Summary - description of transect

Transect 2: Primary and secondary substrates consisted of sand and mud. Snailfishes and giant grenadiers accounted for 57% of the species seen. Poachers and eelpouts were the next most abundant species. Species density was low overall (0.06 individuals/m^2). No sponges or corals were identified.

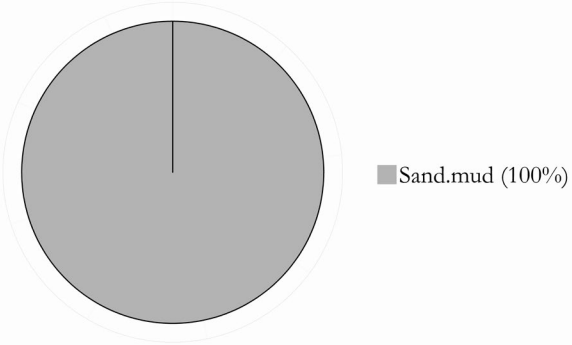
Area: Bering Canyon					Transect 3
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/11/14	54.41	-166.95	1,664	551	3.5

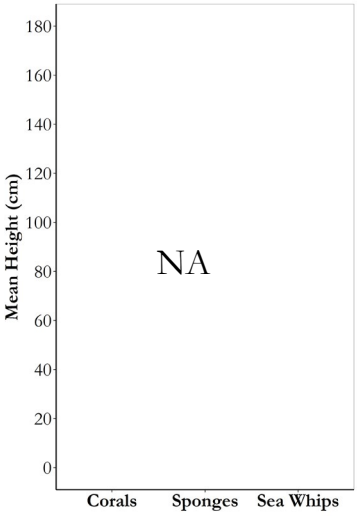
Fish and Crab Composition (n = 74)





Substrate Composition





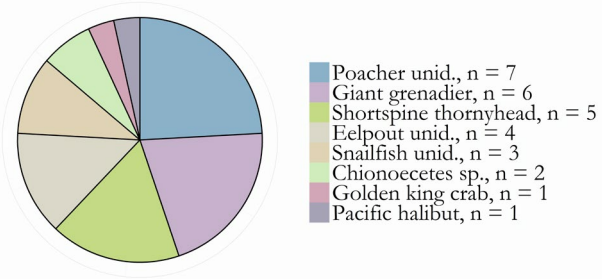
Images

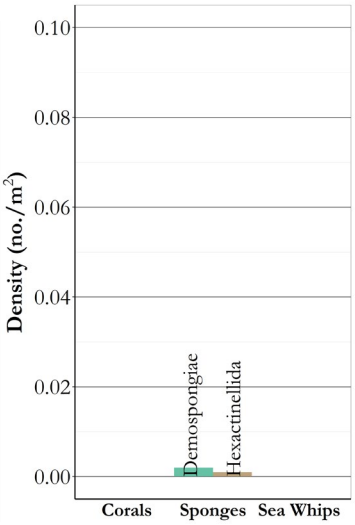
Summary - description of transect

Transect 3: Primary and secondary substrates consisted entirely of sand and mud. Eelpouts and snailfishes were the most abundant species and accounted for 77% of the species composition. Fish density was 0.04 individuals/m^2. Some small Demospongiae contributed to available vertical habitat. No corals were identified.

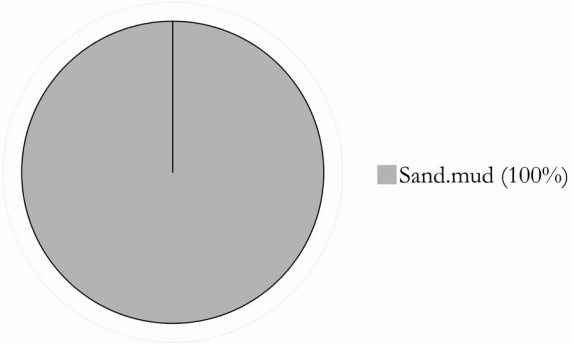
Area: Bering Canyon					Transect 4
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/12/14	54.42	-166.88	1,936	550	3.5

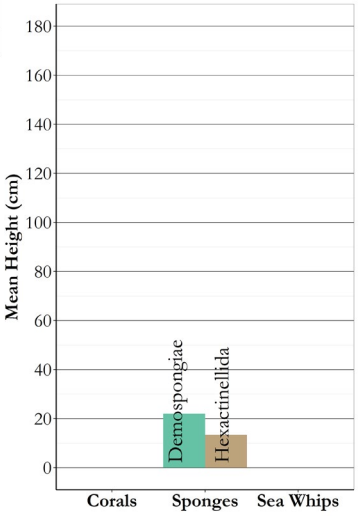
Fish and Crab Composition (n = 29)





Substrate Composition



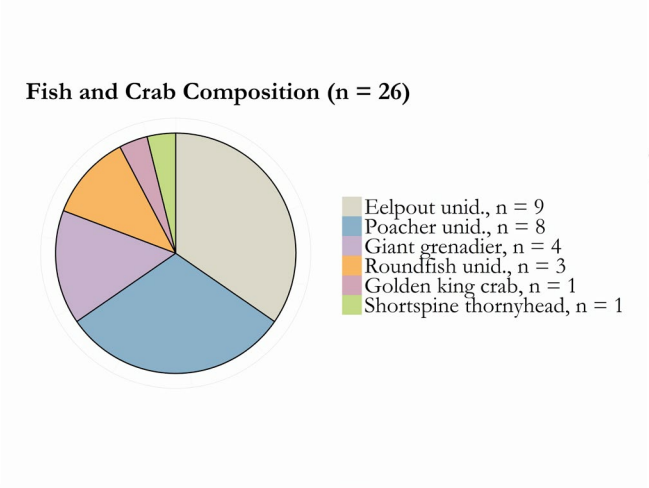


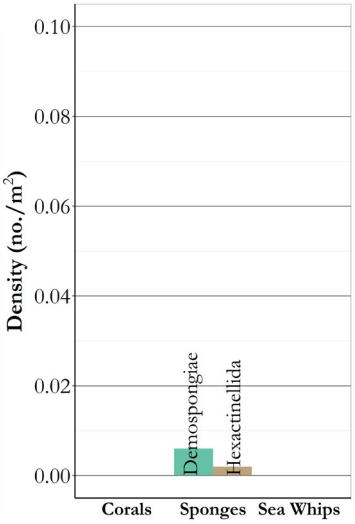
Images

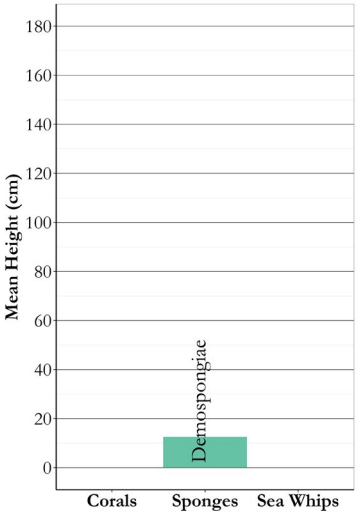
Summary - description of transect

Transect 4: Primary and secondary substrates consisted largely of sand and mud. Species abundance was evenly distributed between poachers, grenadiers, and thornyheads, with smaller counts of snailfishes, halibut and eelpouts. Fish and crab density was 0.01 individuals/m^2. Sponge density was low (< 0.01 individuals/m^2). Demospongiae mean heights were slightly greater than 20.0 cm, while Hexactinellida mean heights were approximately 13.0 cm. No corals were identified.

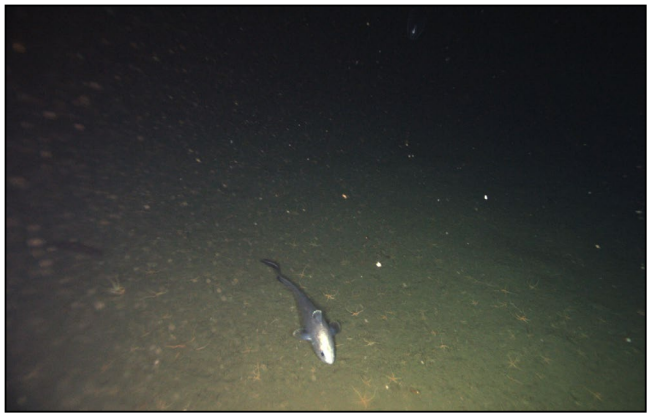
Area: Bering Canyon					Transect 5
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/12/14	54.43	-166.77	2,156	542	3.5







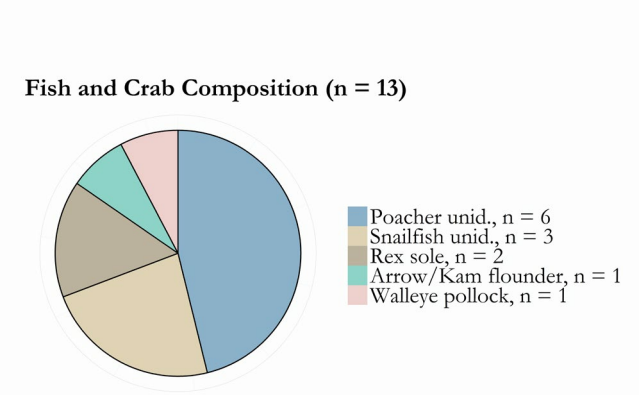
Images

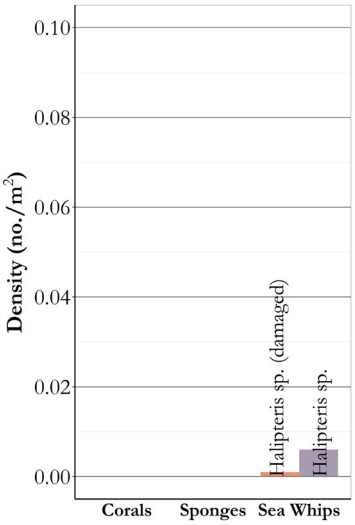


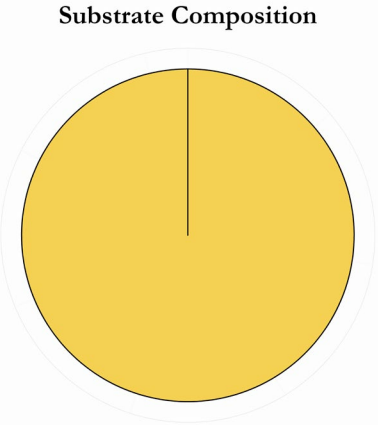
Summary - description of transect

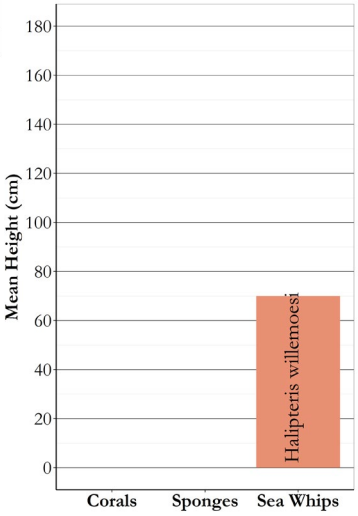
Transect 5: Primary and secondary substrates consisted largely of sand and mud. Giant grenadiers, eelpouts, and poachers comprised 81% of the fish abundance at this transect, and species density for the transect was 0.01 individuals/m^2. Sponge counts were low (12 Demospongiae, 4 Hexactinellida), and averaged 12.6 cm in height. No corals were identified.

Area: Bering Canyon					Transect 232
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/3/14	54.71	-165.68	895	271	4.0







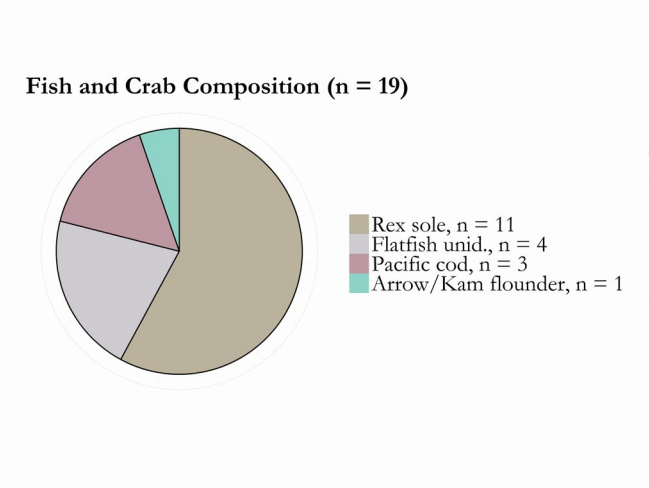


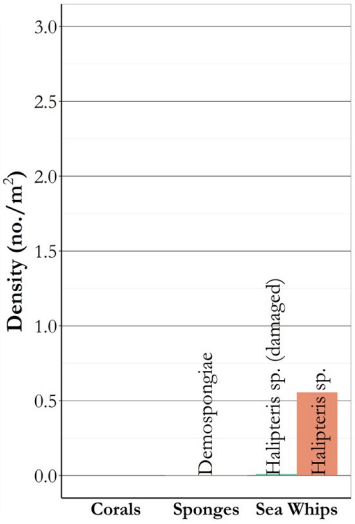
Images

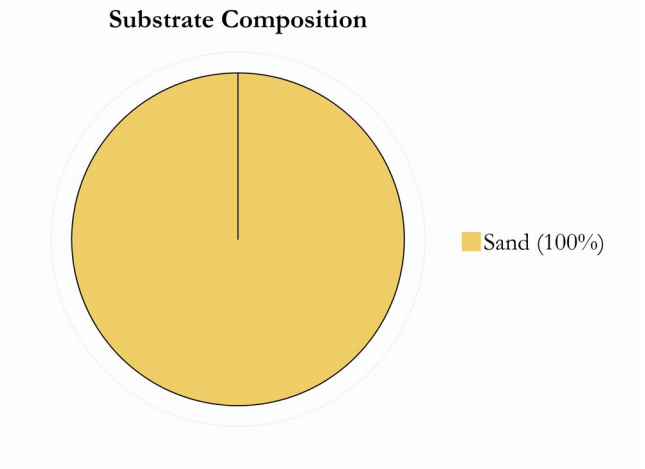
Summary - description of transect

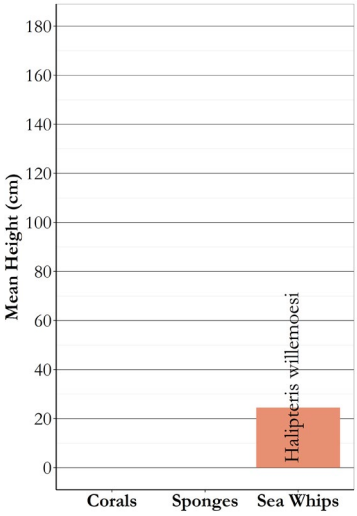
Transect 232: Primary and secondary substrates consisted entirely of mud. Poachers, rex soles, and snailfishes comprised 85% of the fish species identified. Total abundance was low for this transect (0.01 individuals/ m^2) with only 13 fish identified, including one pollock. Six sea whips (1 damaged) were identified and one was measured (70 cm). No other corals or sponges were identified.

Area: Bering Canyon					Transect 233
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/3/14	54.70	-165.60	824	274	4.0

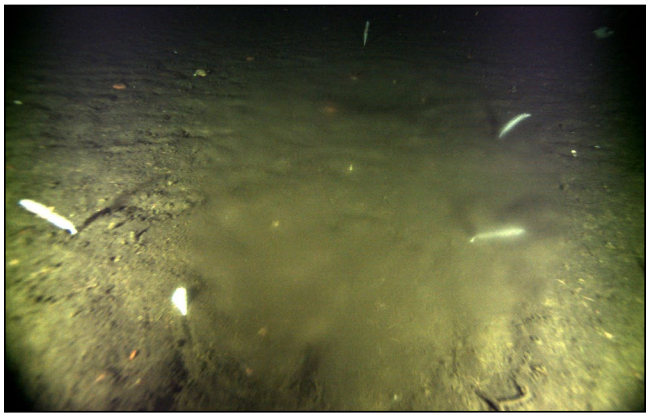


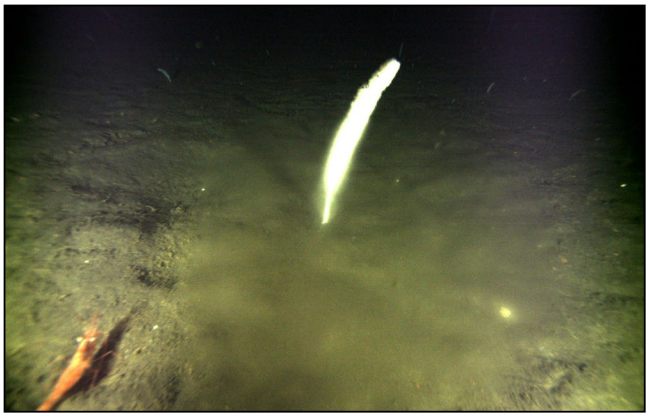






Images

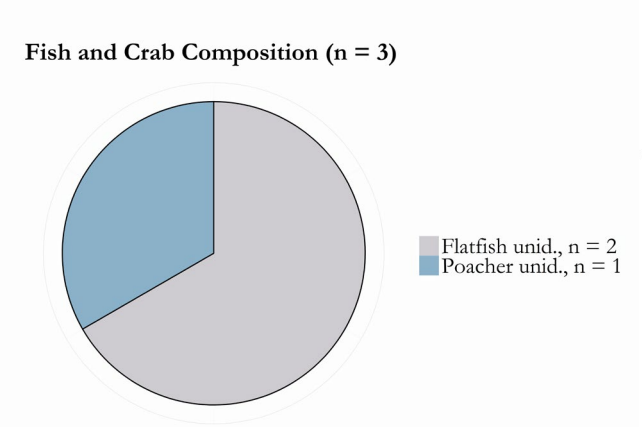


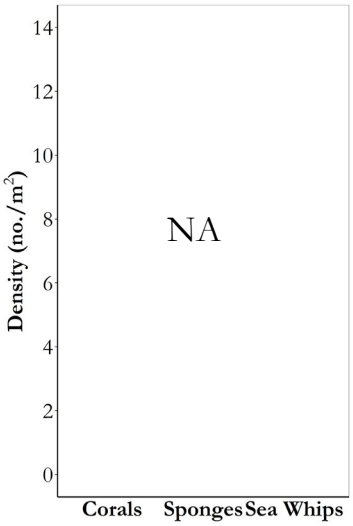


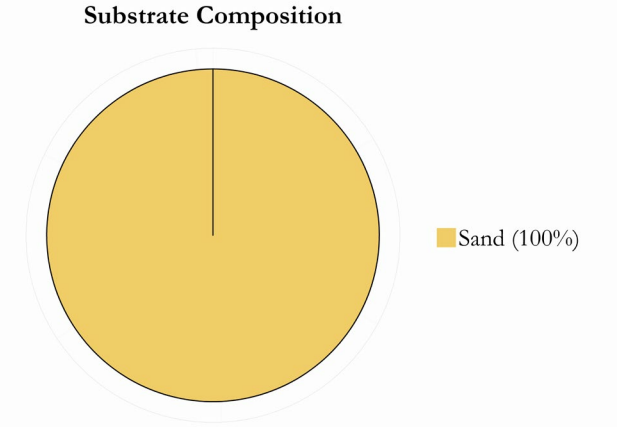
Summary - description of transect

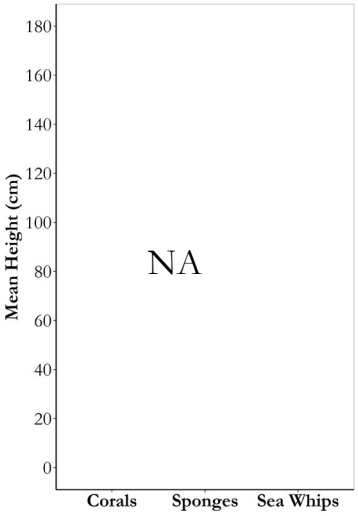
Transect 233: Primary and secondary substrates consisted entirely of sand. Few fish were identified in this transect with the majority (79%) identified as rex sole or flatfishes. There were 466 sea whips identified (8 damaged) and their mean heights approached 25 cm. One small Demospongiae was also found, but not measured. No other corals were identified.

Area: Bering Canyon					Transect 234
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/3/14	54.69	-165.56	552	277	4.0

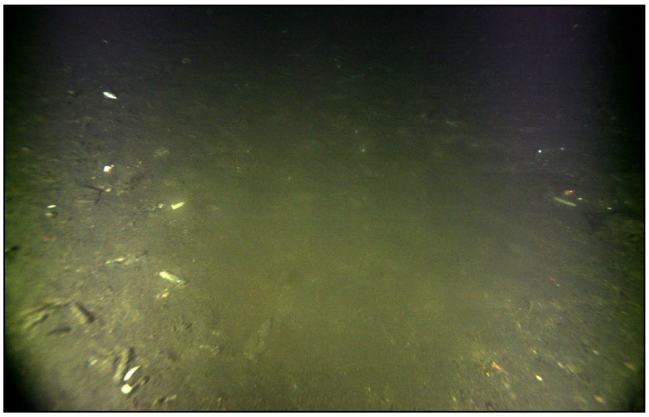








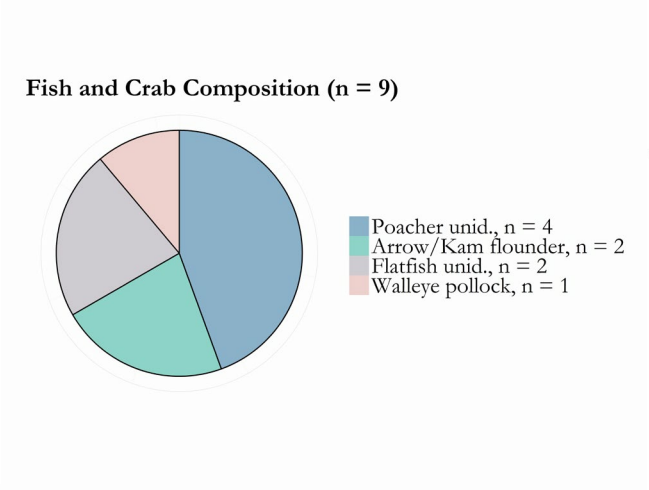
Images

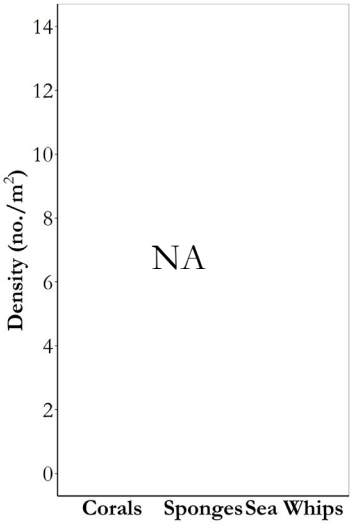


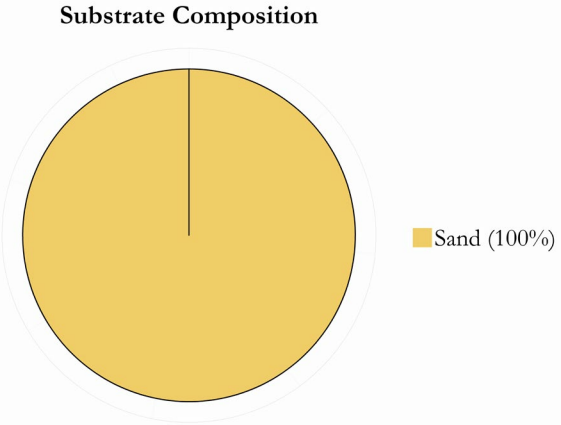
Summary - description of transect

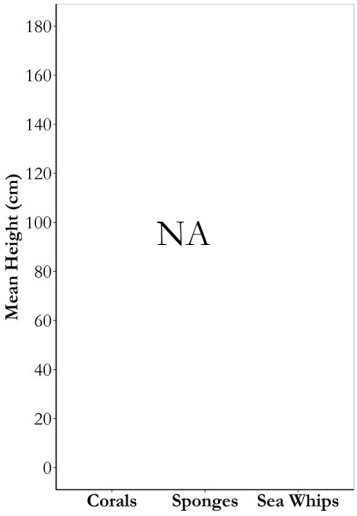
Transect 234: Primary and secondary substrates consisted entirely of sand, but the camera spent over 25% of its time off bottom with no visual input. Two flatfish and one poacher were counted for the entire transect resulting in a density of 0.01 individuals/m^2. No corals or sponges were identified.

Area: Bering Canyon					Transect 235
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/3/14	54.67	-165.59	475	298	3.9

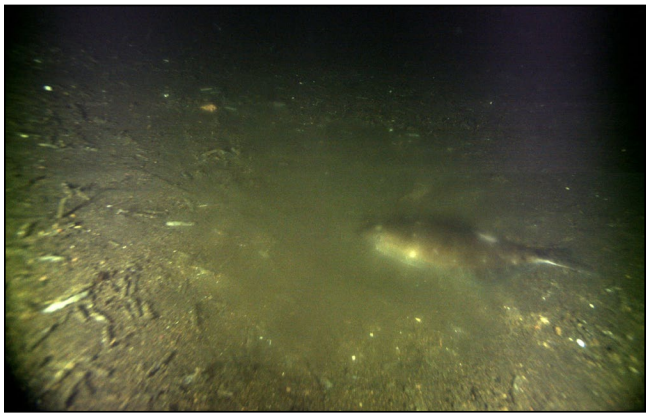


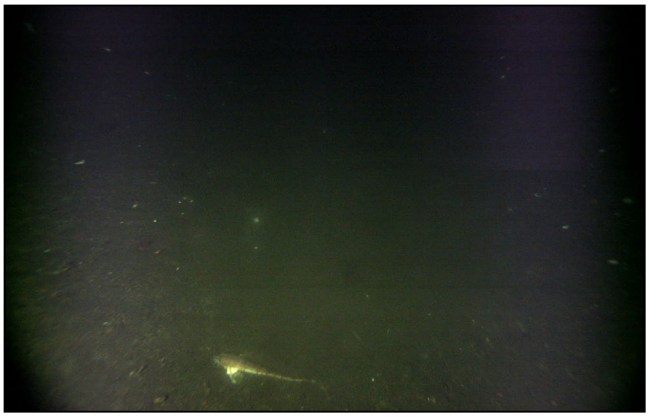






Images





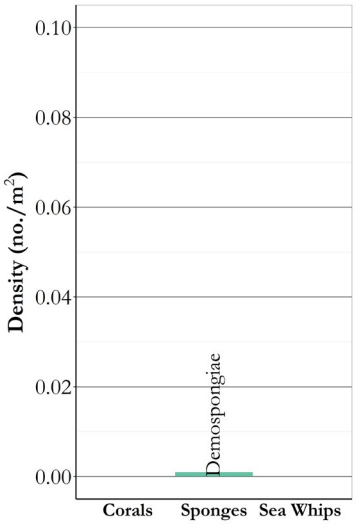
Summary - description of transect

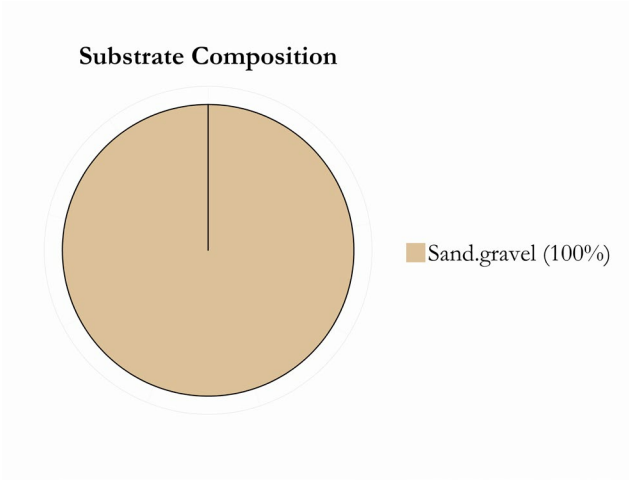
Transect 235: Primary and secondary substrates consisted entirely of sand. The transect was comprised of flatfishes (44%), poachers (44%), and pollock (11%), resulting in a total density of 0.02 individuals/ m^2. No corals or sponges were identified.

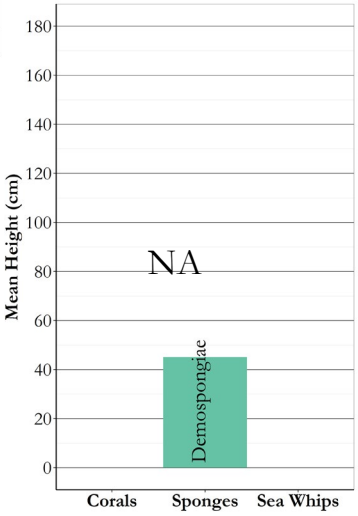
Area: Bering Canyon					Transect 236
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/3/14	54.60	-165.51	804	168	4.2

Fish and Crab Composition

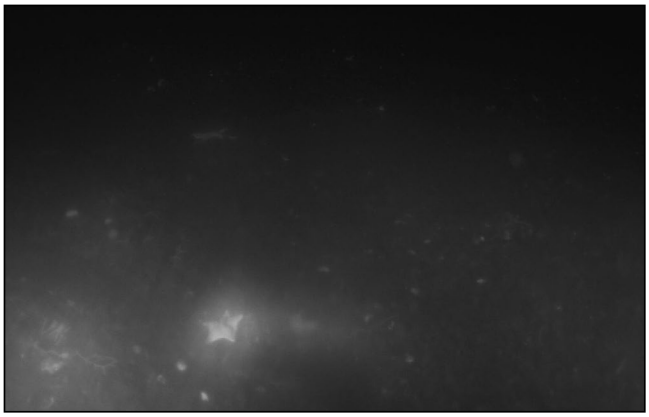
NA







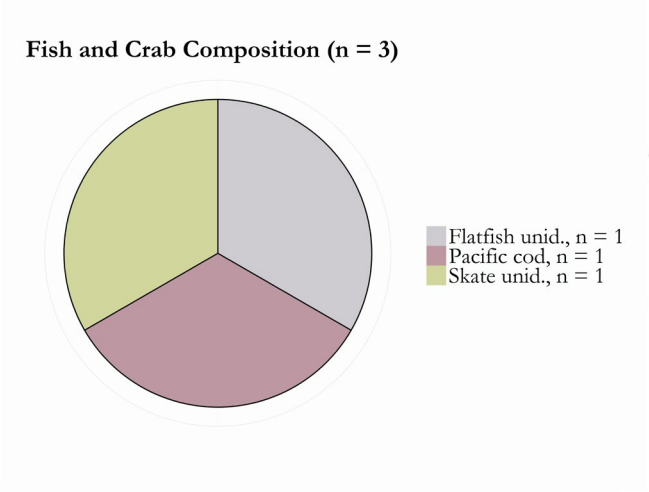
Images

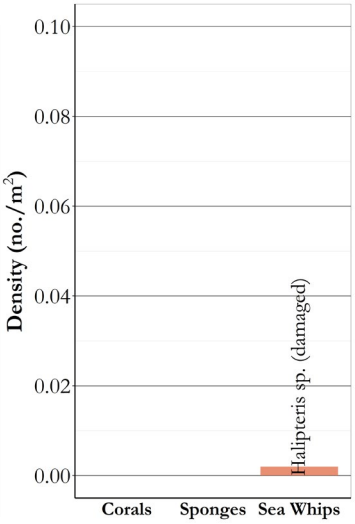


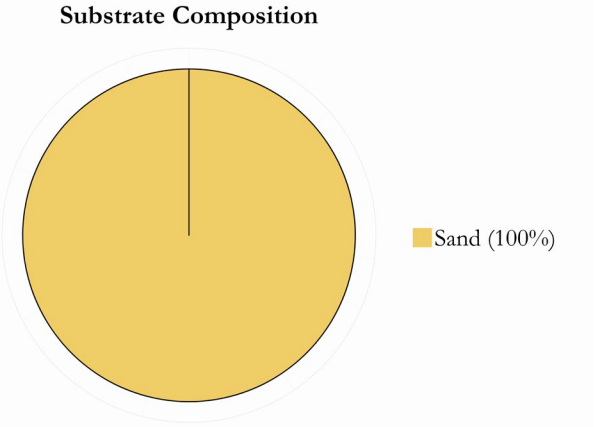
Summary - description of transect

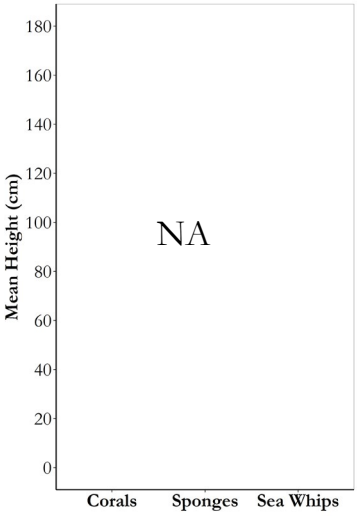
Transect 236: Primary and secondary substrates consisted of sand and gravel, respectively. One Demospongiae was found for the entire transect and no fish. The Demospongiae height was 45 cm providing some vertical habitat in an otherwise flat terrain. No other sponges or corals were found.

Area: Bering Canyon					Transect 237
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/3/14	54.58	-165.57	444	229	4.0

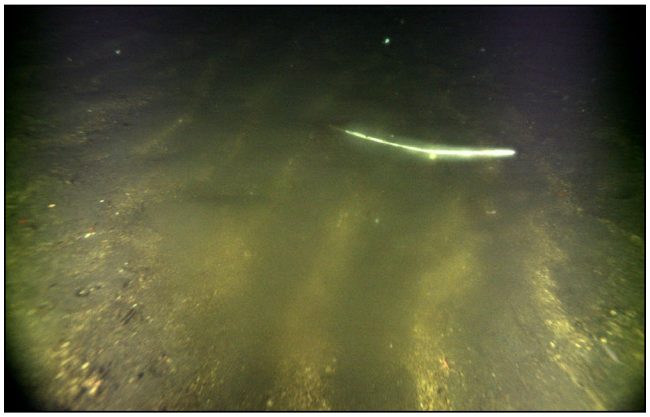








Images



Summary - description of transect

Transect 237: Primary and secondary substrates consisted entirely of sand. Density for this transect was < 0.01 individuals/m^2 with two fish groups (skate, flatfish) and Pacific cod identified. One damaged *Halipteris* sp. was identified but not measured. No other corals or sponges were found.

Bering Canyon to Pribilof Canyon

Eighteen transects were completed between Bering Canyon and Pribilof Canyon. Depths ranged from 143 m to 753 m. Twenty-three taxa of fishes and crabs were identified (Table 10). Vertical habitat was dominated by *Halipteris* sp. (Table 11). Sponge and sea whip heights ranged from 2.4 cm to 266.3 cm (Table 12).

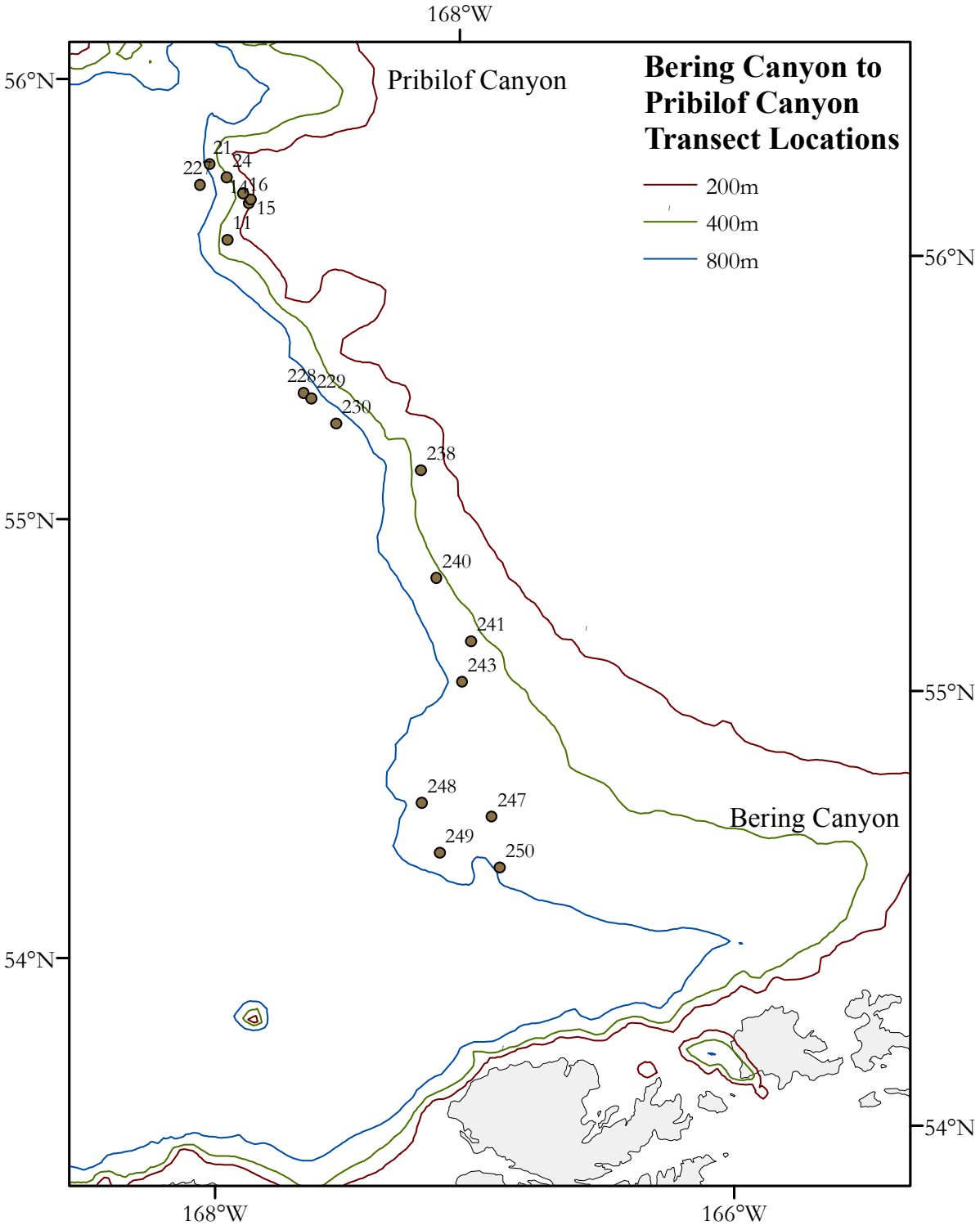


Figure 7. -- Survey transect locations, Bering Canyon to Pribilof Canyon.

SITE SUMMARY: Bering Canyon to Pribilof Canyon

The substrate between Bering Canyon and Pribilof Canyon was consistently mud or sand and mud. Substrates at 17 of the 18 transects contained mud (Table 9). Transect 238 was the only transect where both the primary and secondary substrates were identified as sand.

Of the fish and crab species identified eelpouts, *Chionoecetes* sp., and snailfishes were most frequently observed (Table 10).

Vertical structures consisted of *Halipteris* sp. (98%), Demospongiae (1%), and Hexactinellida (< 1%) (Table 11). *Halipteris* sp. occurred at all depths but was most abundant at transect 238 (Fig. 8). Damaged *Halipteris* sp. were identified at 4 of the 9 transects. *Halipteris* heights ranged from 12.3-266.3 cm with the taller *Halipteris willemoesi* occurring at transects 16, 21, 24, and 238 (Table 12). Demospongiae was identified at the southern and northern boundaries of the inter-canyon region. Only one Hexactinellida was observed at transect 21 along the outer edge of Pribilof Canyon (Fig. 9).

Table 9. -- Summary of substrates observed at transects (n = 18) between Bering Canyon and Pribilof Canyon.

Substrate	Depth range (m)	Number of transects with observed substrate	Percent of observations
Mud*	346 - 753	11	64%
Sand.mud	143 - 226	6	30%
Sand*	217 - 217	1	6%

*Primary and secondary substrates were the same.

Table 10. -- Summary of fishes and crabs identified at transects (n = 18) between Bering Canyon and Pribilof Canyon.

Species/Grouping	Number of occurrences	Number of transects with occurrences	Mean transect depth range (m)	Mean density (individuals/m^2)
Eelpout unid.	253	16	143 - 753	0.01
Snailfish unid.	128	10	143 - 753	0.04
Chionoecetes sp.	78	9	143 - 753	0.01
Roundfish unid.	65	9	143 - 394	0.01
Giant grenadier	53	4	664 - 753	0.01
Flatfish unid.	48	7	143 - 688	0.01
Popeye grenadier	42	3	670 - 753	0.01
Poacher unid.	35	11	143 - 753	<0.01
Arrow/Kam flounder	23	4	143 - 226	<0.01
Shortspine thornyhead	20	6	346 - 705	0.01
Skate unid.	13	7	150 - 753	<0.01
Sculpin	13	6	143 - 346	<0.01
Crab unid.	11	5	143 - 226	<0.01
Pacific ocean perch	9	2	217 - 226	<0.01
Rex sole	5	4	143 - 394	<0.01
Pacific cod	3	3	143 - 144	<0.01
Flathead sole	2	2	143 - 144	<0.01
King crab unid.	1	1	688 - 688	<0.01
Sablefish	1	1	664 - 664	<0.01
Rockfish unid.	1	1	150 - 150	<0.01
Scarlet king crab	1	1	705 - 705	<0.01

SITE SUMMARY: Bering Canyon to Pribilof Canyon

Table 11. -- Summary of coral, sponge, and sea whip taxa identified at transects (n = 18) between Bering Canyon and Pribilof Canyon.

Species/Grouping	Number of occurrences	Number of transects with occurrences	Mean transect depth range (m)	Mean density (individuals/m^2)
Halipteris sp.	2,027	9	144 - 705	0.13
Halipteris sp. (damaged)	383	4	144 - 226	0.04
Demospongiae	28	4	226 - 566	0.01
Hexactinellida	1	1	226 - 226	<0.01

**Halipteris* sp. (damaged) is not accounted for in the *Halipteris* sp. grouping.

Table 12. -- Summary of coral, sponge, and sea whip heights from transects completed between Bering Canyon and Pribilof Canyon.

Species/Grouping	Number measured	Mean height (cm)	Minimum height (cm)	Maximum height (cm)
Halipteris willemoesi	298	97.3	12.3	266.3
Halipteris sp.	122	9.0	2.4	71.3
Demospongiae	4	29.2	11.3	50.5

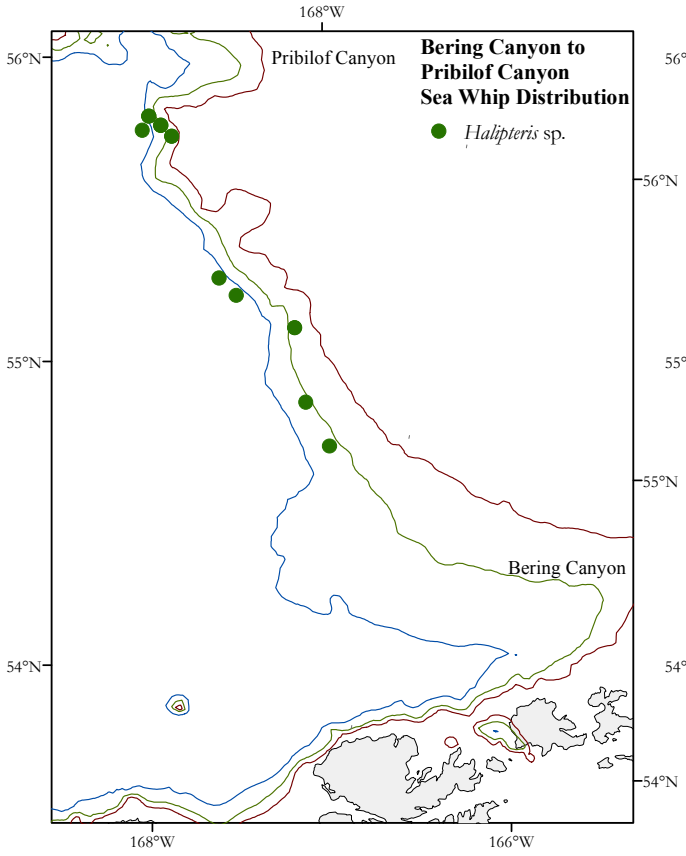


Figure 8. -- Sea whip distribution, Bering Canyon to Pribilof Canyon.

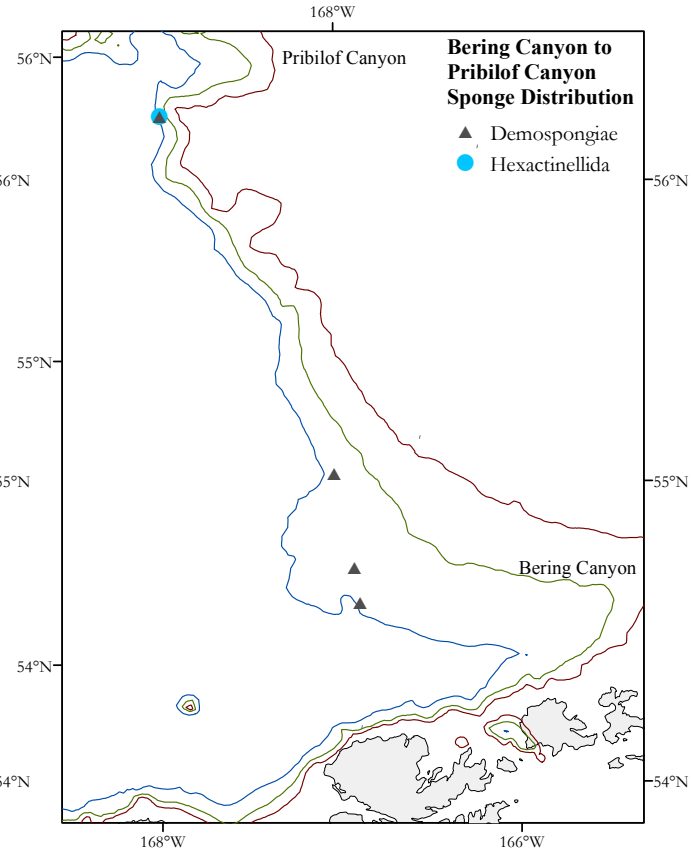
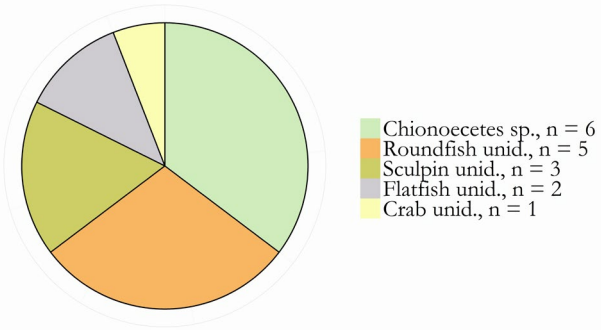
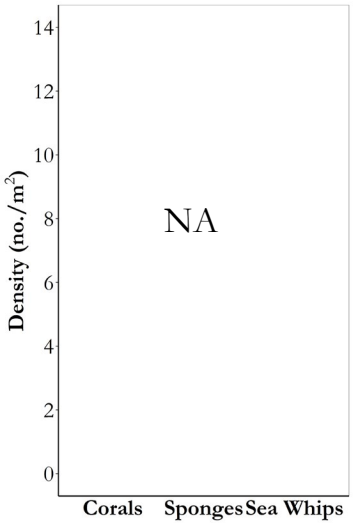


Figure 9. -- Sponge distribution, Bering Canyon to Pribilof Canyon.

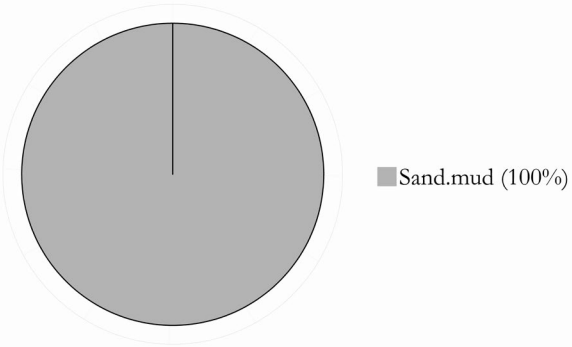
Area: Bering Canyon to Pribilof Canyon					Transect 11
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/12/14	55.72	-168.77	883	163	4.1

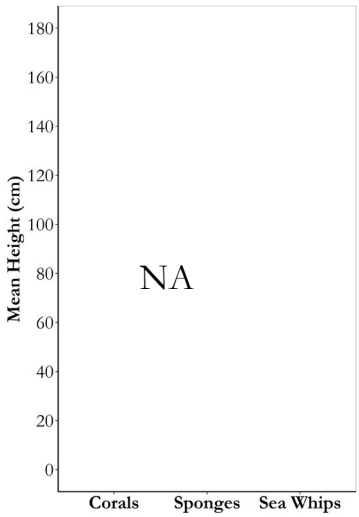
Fish and Crab Composition (n = 17)





Substrate Composition



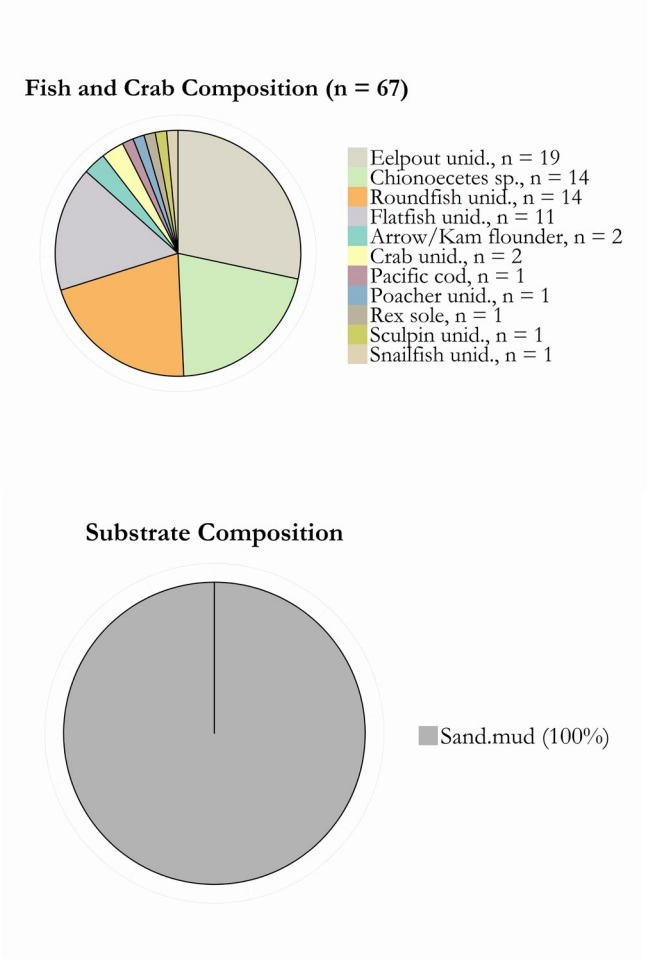


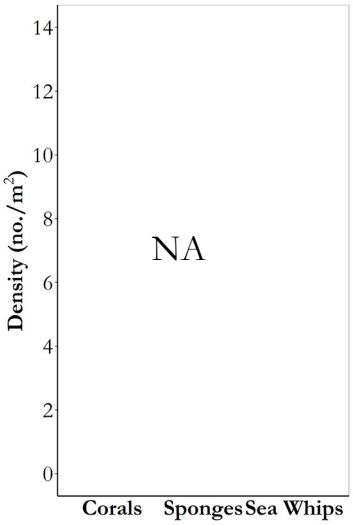
Images

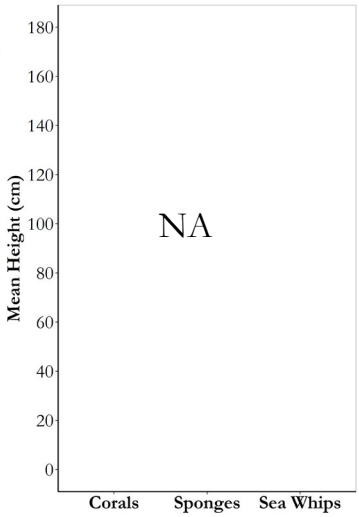
Summary - description of transect

Transect 11: Primary and secondary substrates consisted of sand and mud. Crabs composed 41% of the total abundance. Unidentified roundfishes, flatfishes and sculpins made up the remaining 59% of the taxa found. Density for this transect was 0.02 individuals/m^2. No corals or sponges were identified.

Area: Bering Canyon to Pribilof Canyon					Transect 14
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/12/14	55.81	-168.72	1,216	143	4.2





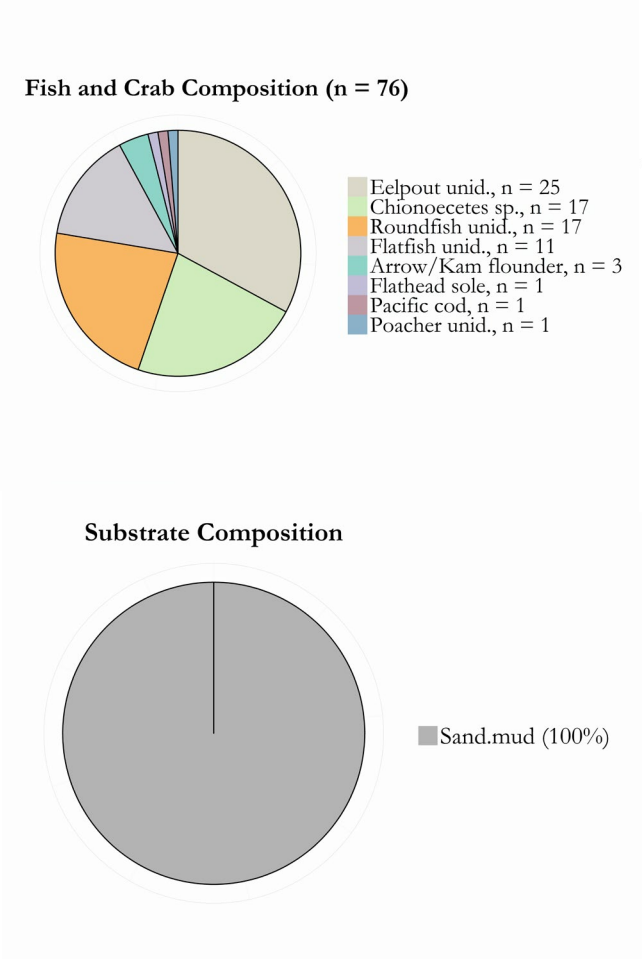


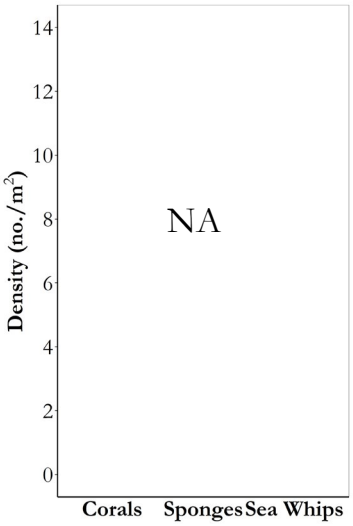
Images

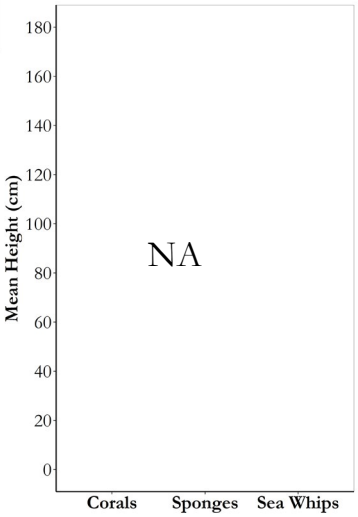
Summary - description of transect

Transect 14: Primary and secondary substrates consisted entirely of sand and mud. Fish and crab density for this transect was 0.06 individuals/m^2, with crabs comprising 24% of the observations and eelpouts being the most abundant. Eleven taxa were identified, making this transect relatively diverse in relation to other transects. No corals or sponges were identified.

Area: Bering Canyon to Pribilof Canyon					Transect 15
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/12/14	55.82	-168.71	1,244	143	4.2







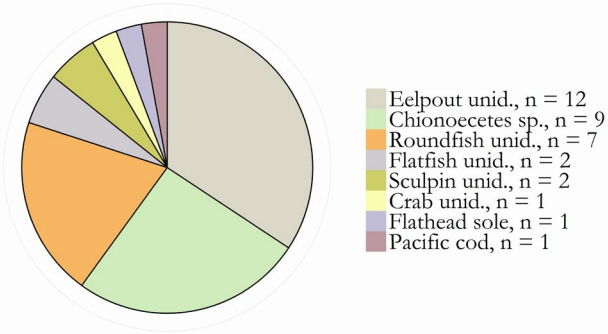
Images

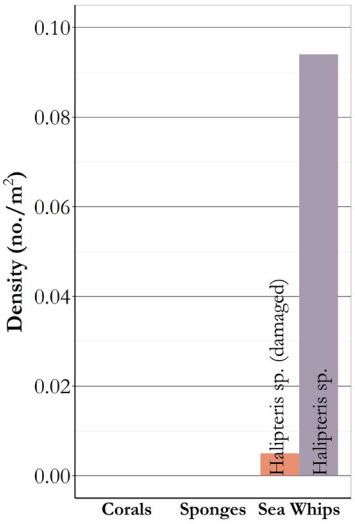
Summary - description of transect

Transect 15: Primary and secondary substrates consisted entirely of sand and mud. Of the 76 individuals identified, 22% were crabs. Eelpouts, flatfishes, and unidentified roundfishes accounted for another 74% of the observations. Species density was 0.06 individuals/m^2. No corals or sponges were identified.

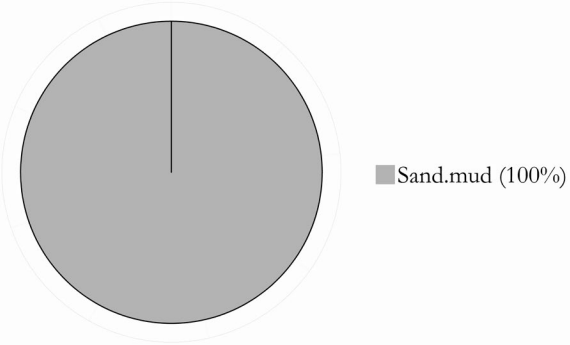
Area: Bering Canyon to Pribilof Canyon					Transect 16
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/13/14	55.83	-168.75	1,673	144	4.2

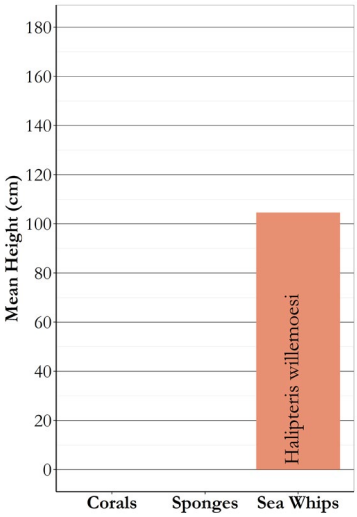
Fish and Crab Composition (n = 35)



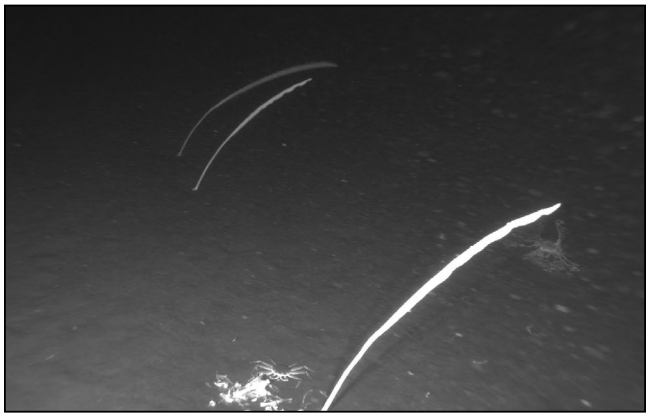


Substrate Composition





Images

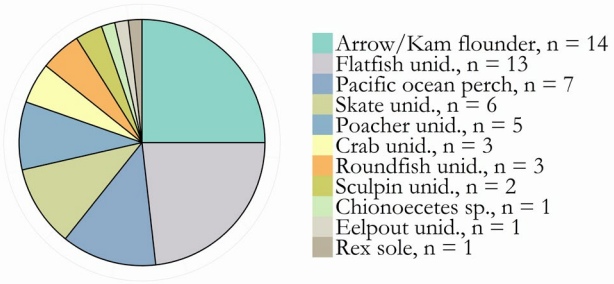


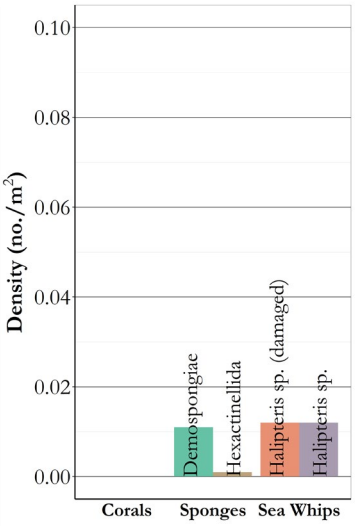
Summary - description of transect

Transect 16: Primary and secondary substrates consisted entirely of sand and mud. Only 35 individuals were identified, resulting in a low density (0.02 individuals/m^2). Crabs and eelpouts made up 63% of all taxa found. Vertical habitat consisted of 166 sea whips, 9 of which were damaged. Sea whip density was 0.10 individuals/m^2. Eighty-six of the sea whips were measured for an average height of 104.5 cm. No other corals or sponges were found.

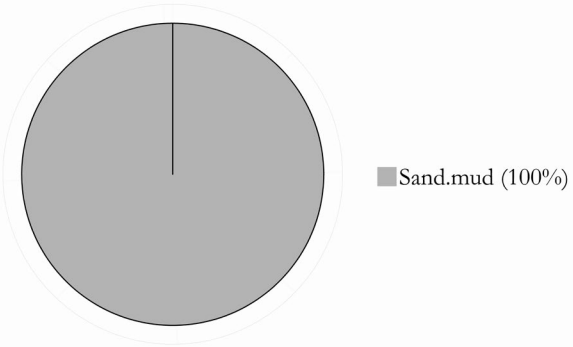
Area: Bering Canyon to Pribilof Canyon					Transect 21
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/13/14	55.88	-168.91	1,375	226	3.9

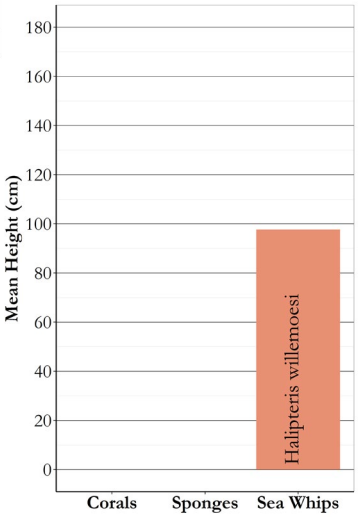
Fish and Crab Composition (n = 56)



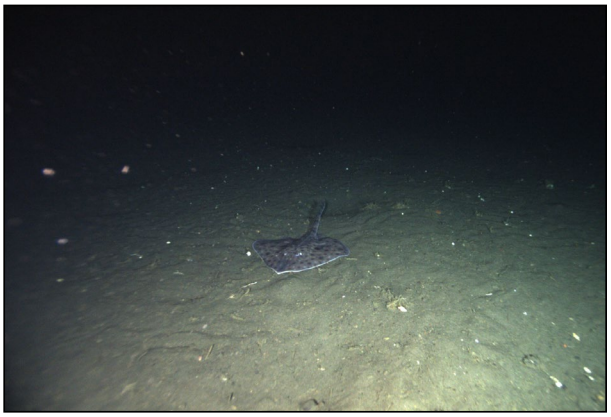


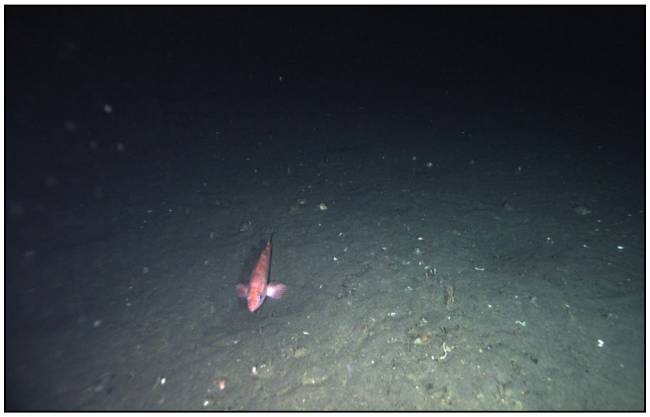
Substrate Composition





Images

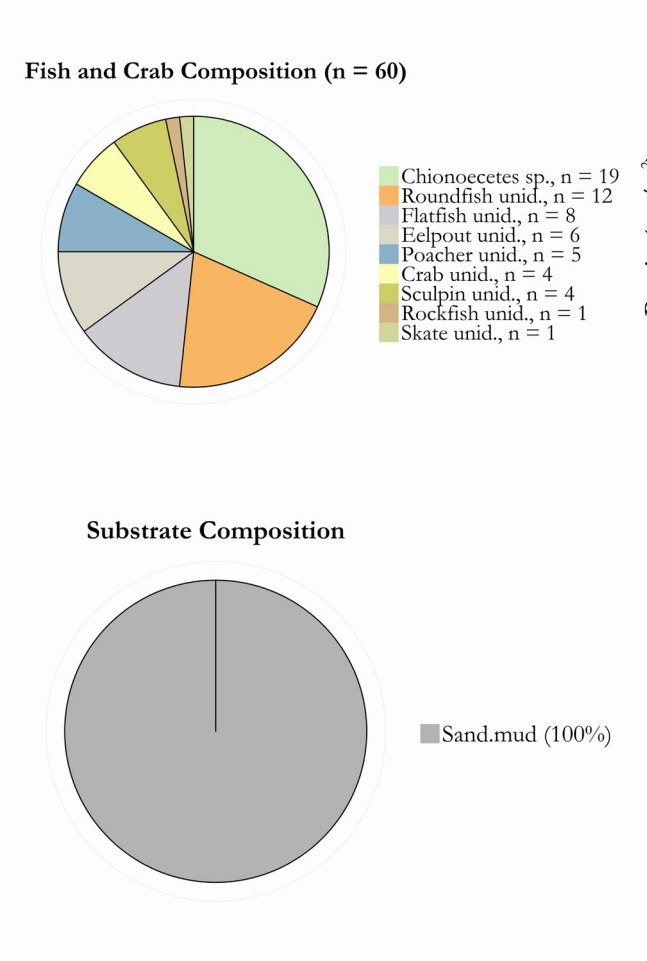


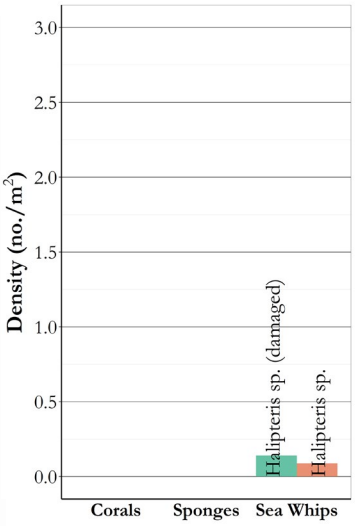


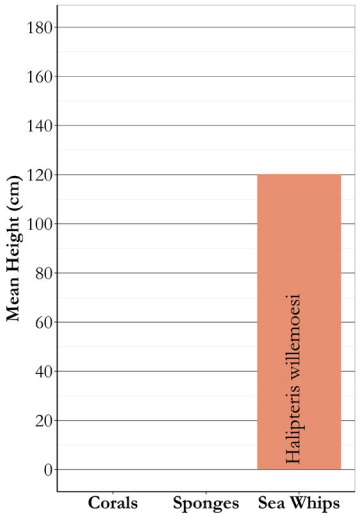
Summary - description of transect

Transect 21: Primary and secondary substrates consisted mostly of sand and mud. Flatfishes comprised 48% of the 56 fish and crab species identified. Six skates and 7 Pacific ocean perch were counted. Fish and crab density was 0.04 individuals/m^2. Vertical habitat was composed of sea whips, Demospongiae ($n = 15$), and a Hexactinellida ($n = 1$). Over half ($n = 17$) of the *Halipteris* sp. were damaged. Six undamaged *Halipteris* sp. were measured for a mean height of 97.7 cm. Vertical habitat density was 0.04 individuals/m^2.

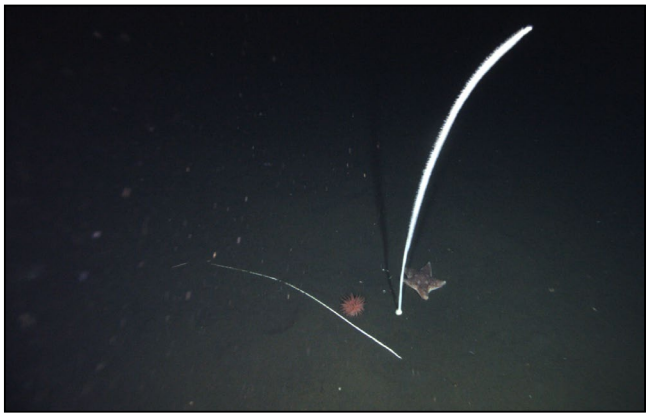
Area: Bering Canyon to Pribilof Canyon					Transect 24
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/13/14	55.86	-168.83	2,231	150	4.0







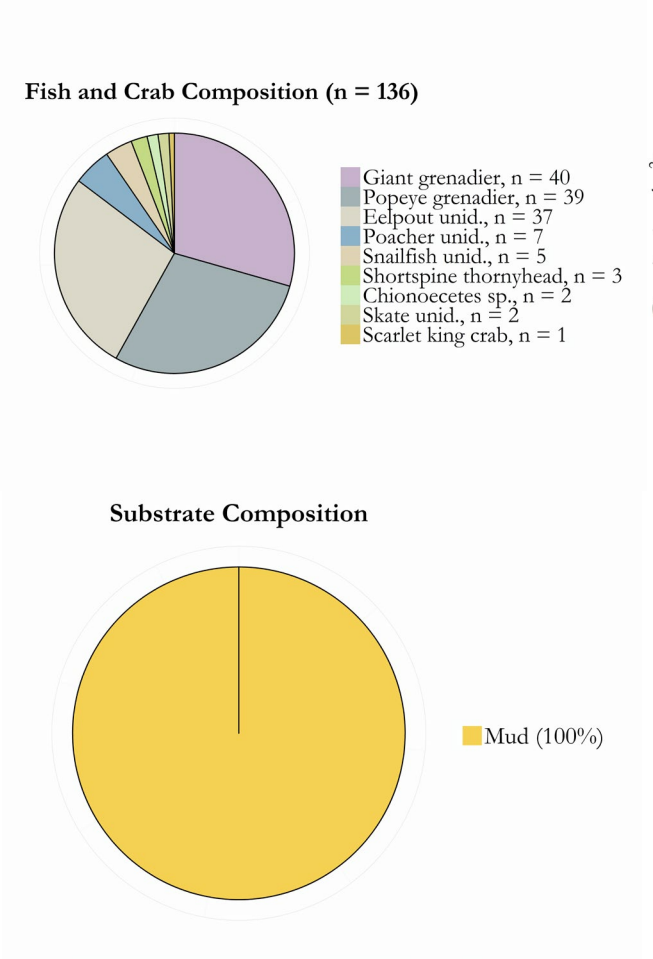
Images

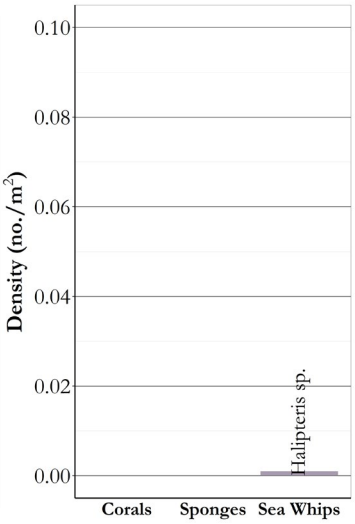


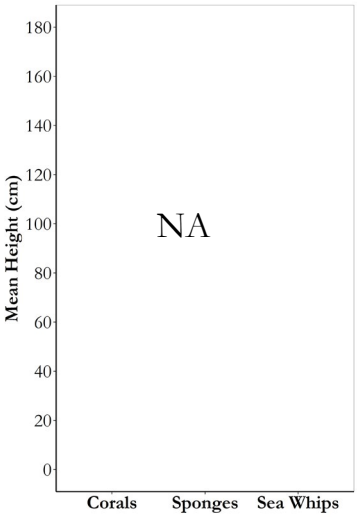
Summary - description of transect

Transect 24: Primary and secondary substrates consisted entirely of sand and mud. Of the 60 individuals identified, 39% were crabs, and 43% were eelpouts, flatfishes, and unidentified roundfishes. One skate was identified. Total species density was 0.03 individuals/m^2. Sea whip density was 0.23 individuals/m^2. There were 510 total sea whips counted, but 313 of them were damaged. Over 80 sea whips were measured with a mean height of 120.2 cm. No other vertical habitat was identified.

Area: Bering Canyon to Pribilof Canyon					Transect 227
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/2/14	55.83	-168.93	1,424	705	NA





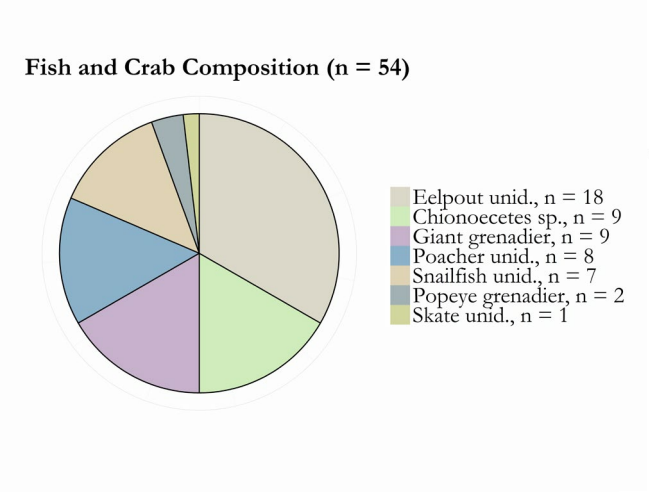


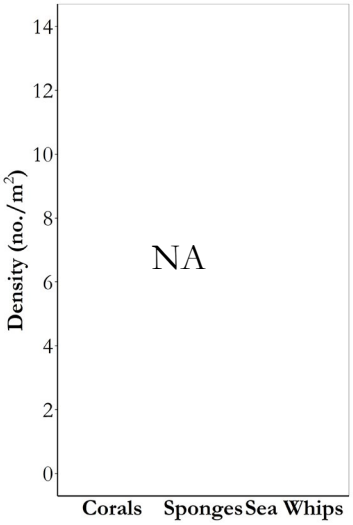
Images

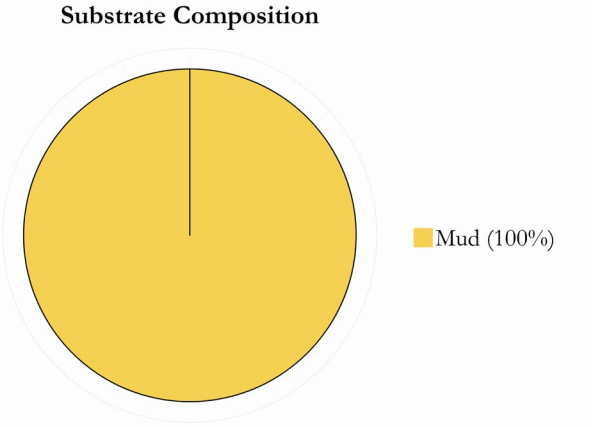
Summary - description of transect

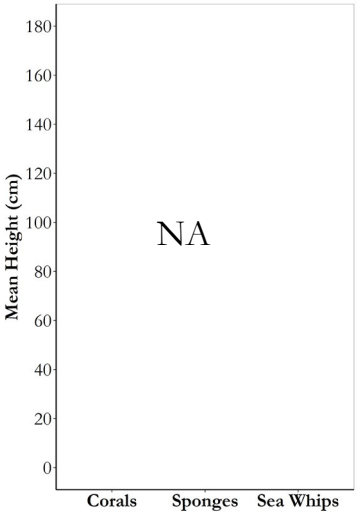
Transect 227: Primary and secondary substrates consisted entirely of mud. Overall fish and crab density was 0.10 individuals/m^2. Grenadiers accounted for 58% of the enumerated taxa. The next most abundant taxa were eelpouts (27%). Vertical habitat consisted of two *Halipteris* sp. No other corals or sponges were observed.

Area: Bering Canyon to Pribilof Canyon					Transect 228
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/2/14	55.41	-168.32	808	753	3.2

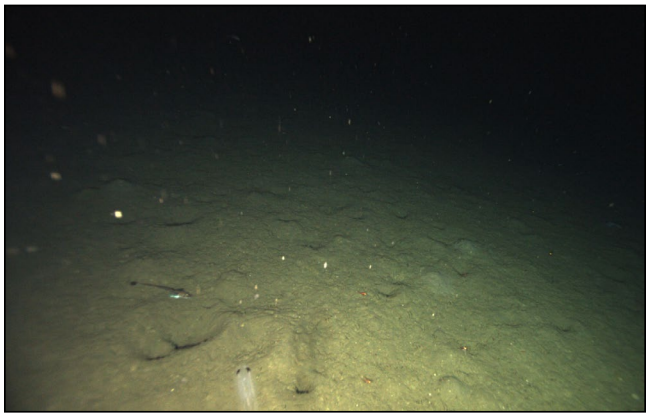


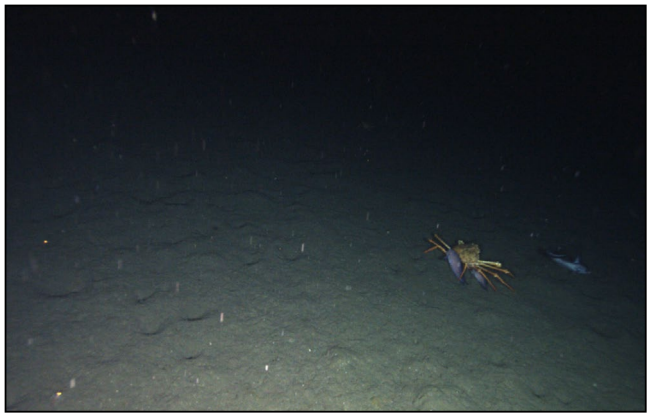






Images

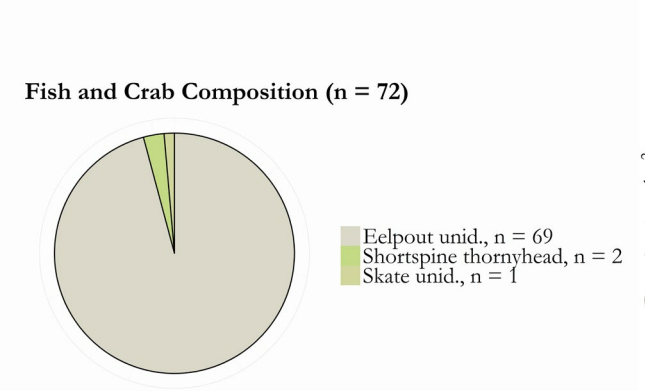


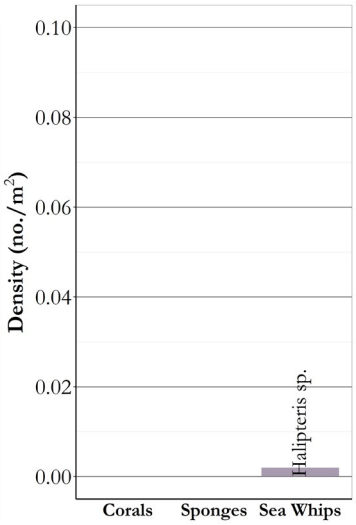


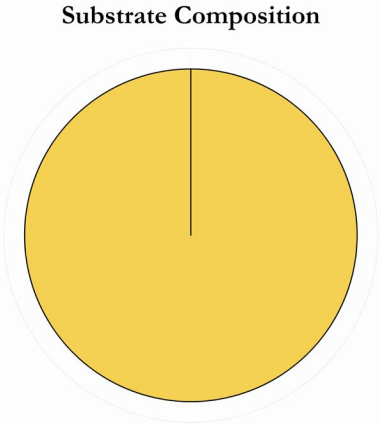
Summary - description of transect

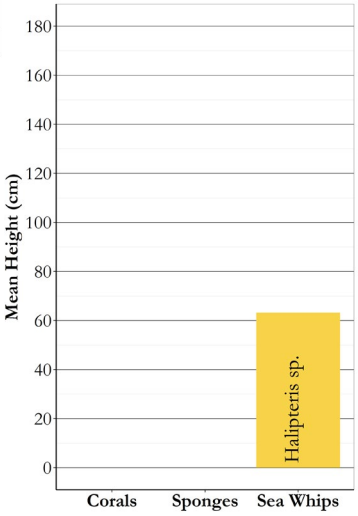
Transect 228: Primary and secondary substrates consisted entirely of mud. Species density for the transect was low (0.07 individuals/m^2) with eelpouts most frequently identified. Crabs (*Chionoecetes* sp.), grenadiers, poachers and snailfishes were identified in relatively similar abundances. One skate was identified, but no sponges or corals were identified.

Area: Bering Canyon to Pribilof Canyon					Transect 229
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/2/14	55.40	-168.29	1,058	575	3.5

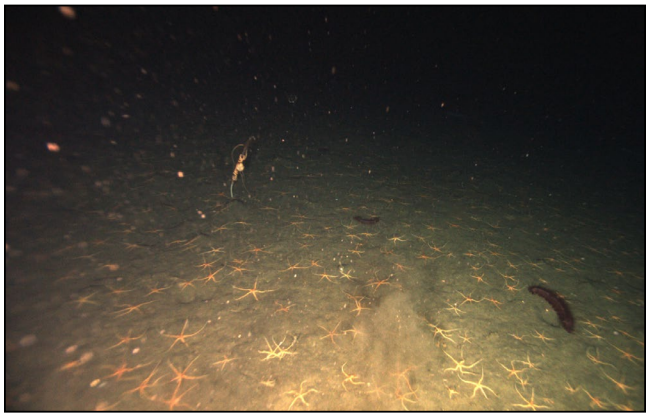








Images

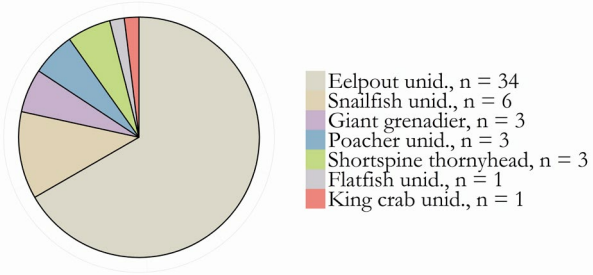


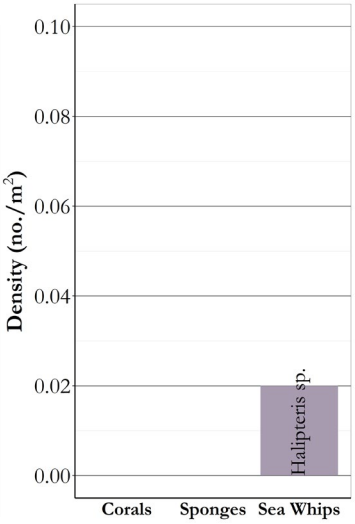
Summary - description of transect

Transect 229: Primary and secondary substrates consisted entirely of mud. Species density (0.07 individuals/m^2) was largely composed of eelpout (96%). Two sea whips (*Halipteris* sp.) and one skate were also identified. The mean height of *Halipteris* sp. exceeded 60 cm contributing to vertical habitat. No sponges were identified for this transect.

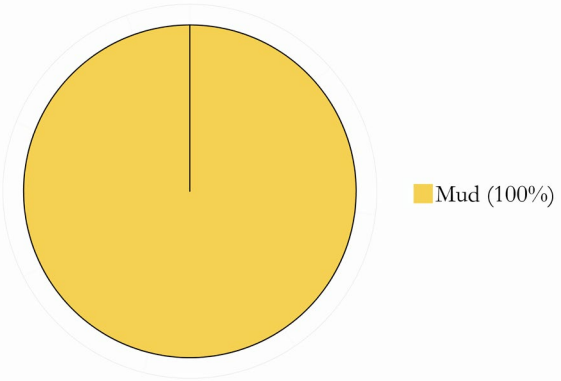
Area: Bering Canyon to Pribilof Canyon					Transect 230
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/3/14	55.35	-168.17	799	688	NA

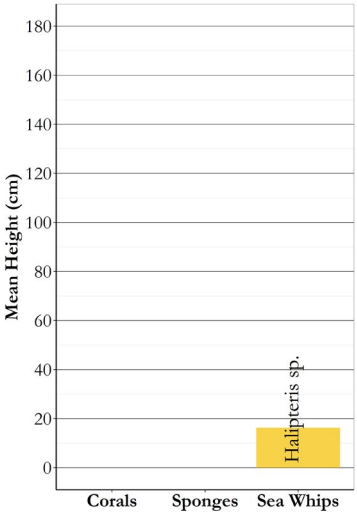
Fish and Crab Composition (n = 51)



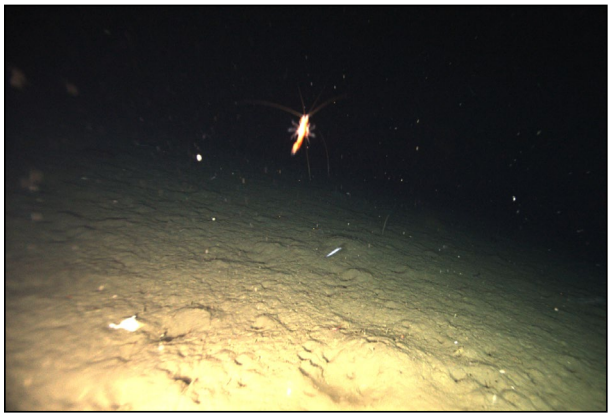


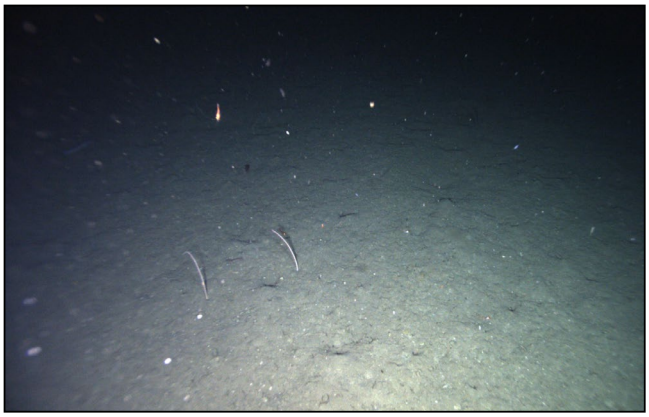
Substrate Composition





Images

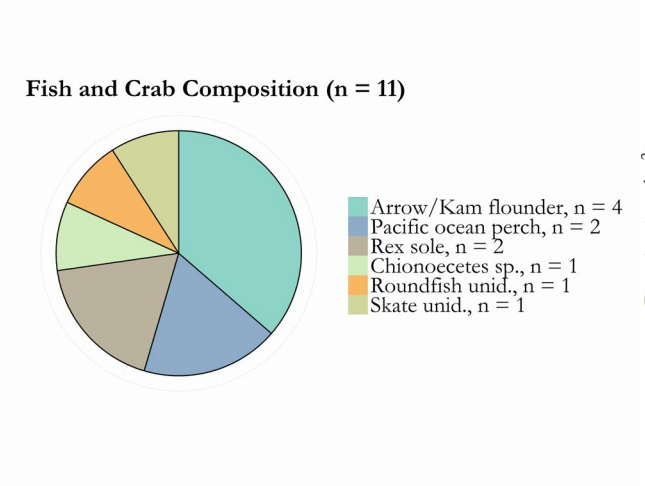


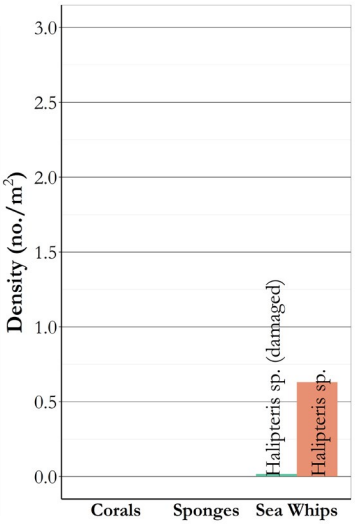


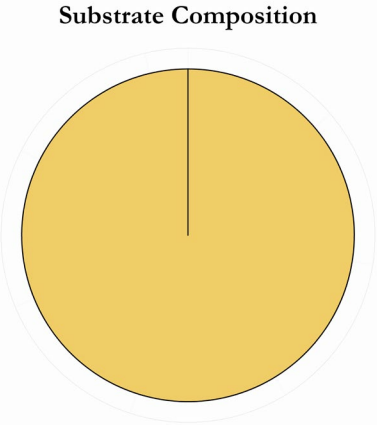
Summary - description of transect

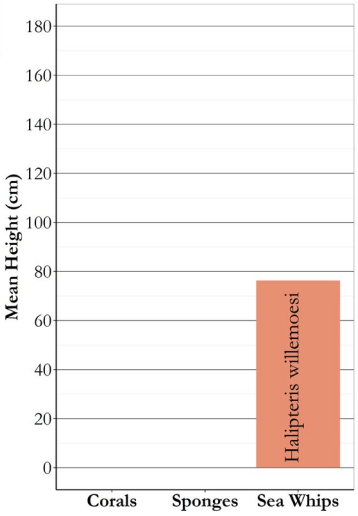
Transect 230: Primary and secondary substrates consisted entirely of mud. Over half (67%) of the taxa identified were eelpouts. Total density for this transect was 0.06 individuals/m^2, with an assortment of species found in abundances of less than 10. Small sea whips were present ($n = 16$) with mean heights of 15 cm. No other corals or sponges were identified.

Area: Bering Canyon to Pribilof Canyon					Transect 238
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/4/14	55.29	-167.79	2,366	217	4.1

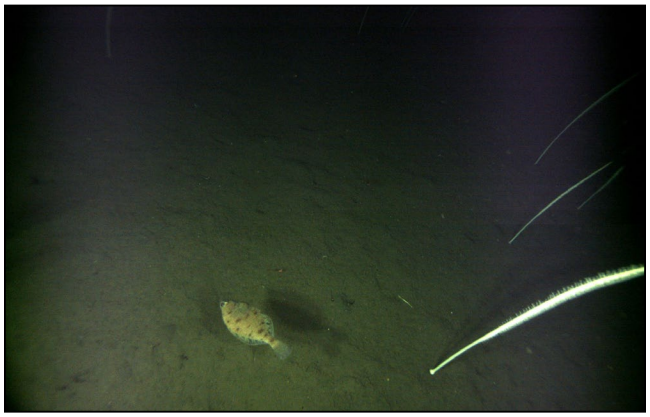








Images

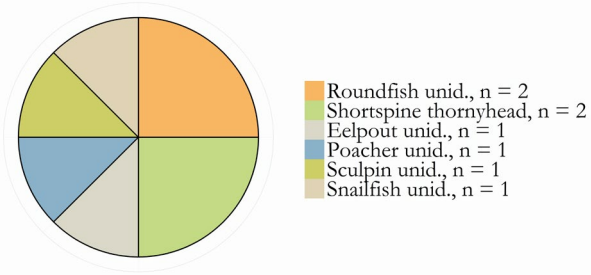


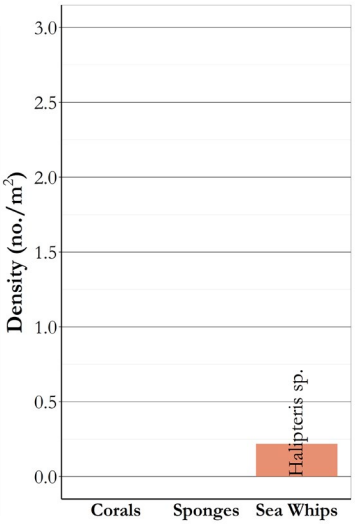
Summary - description of transect

Transect 238: Primary and secondary substrates consisted entirely of sand. Only 11 individuals were counted for this transect and 54% were flatfishes (rex sole and arrowtooth). Species density was 0.01 individuals/m^2. Over 1,500 sea whips (44 damaged) were identified in this transect and dominated the landscape (0.65 individuals/m^2). *Halipteris willemoesi* mean height was approximately 78 cm, but few crabs or fishes seemed to associate with the *H. willemoesi* No other corals or sponges were identified.

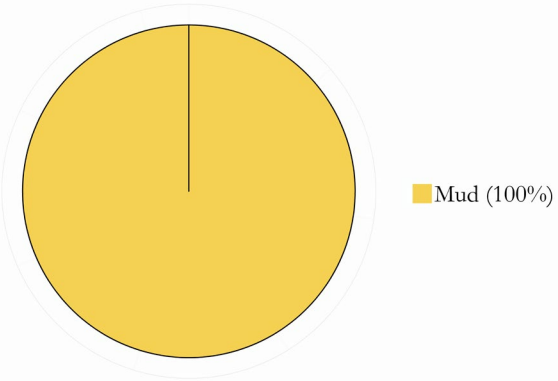
Area: Bering Canyon to Pribilof Canyon					Transect 240
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/4/14	55.05	-167.64	534	346	3.9

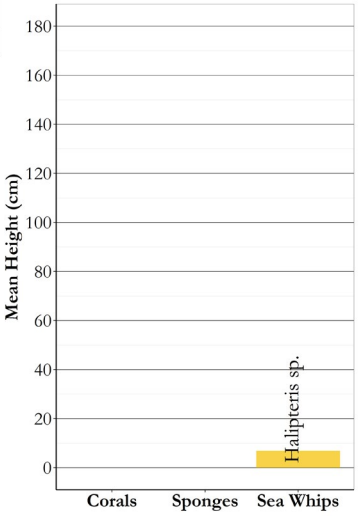
Fish and Crab Composition (n = 8)





Substrate Composition



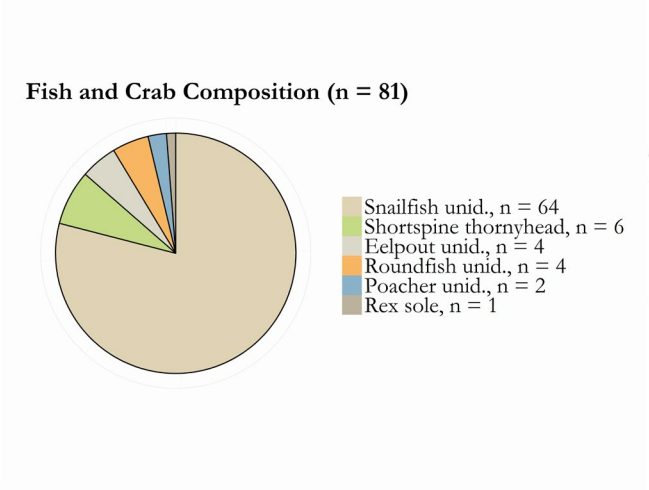


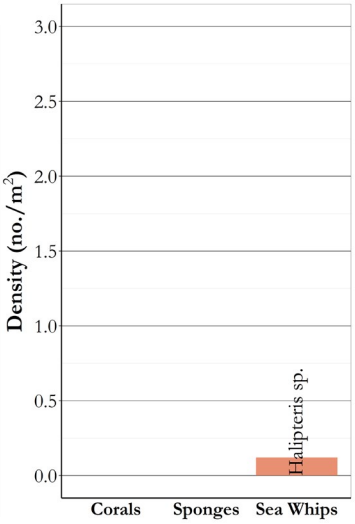
Images

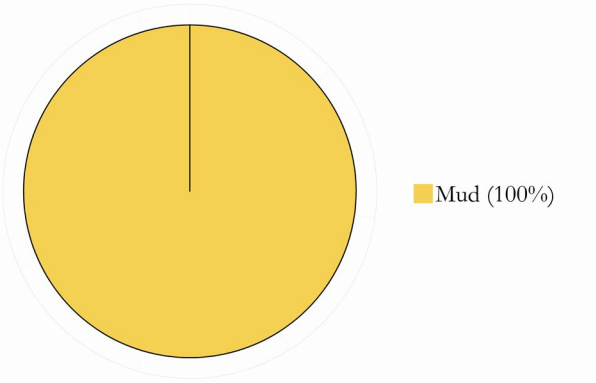
Summary - description of transect

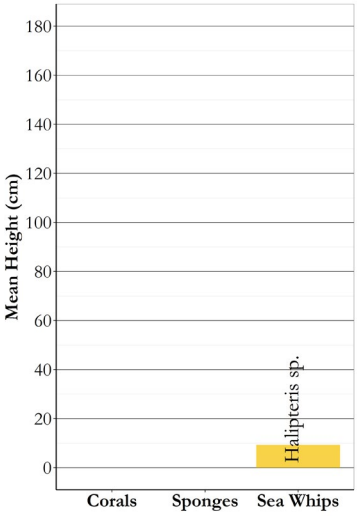
Transect 240: Primary and secondary substrates consisted entirely of mud. Species density was low (0.01 individuals/m^2), with only 8 assorted fishes counted. Sea whips were abundant (n = 117), but small. Their mean height was 6.9 cm, and density was 0.22 individuals/m^2. No other corals or sponges were identified.

Area: Bering Canyon to Pribilof Canyon					Transect 241
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/4/14	54.92	-167.45	223	394	3.9

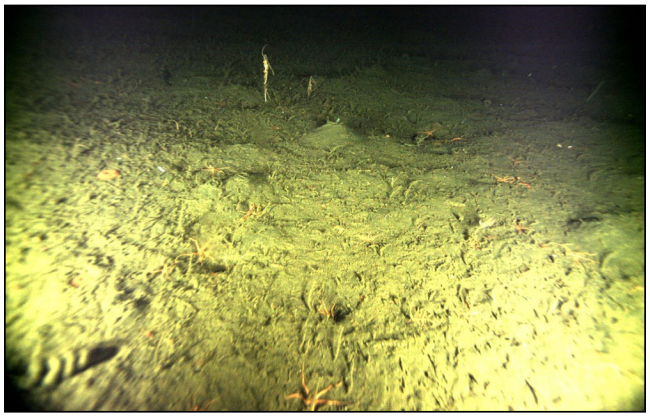


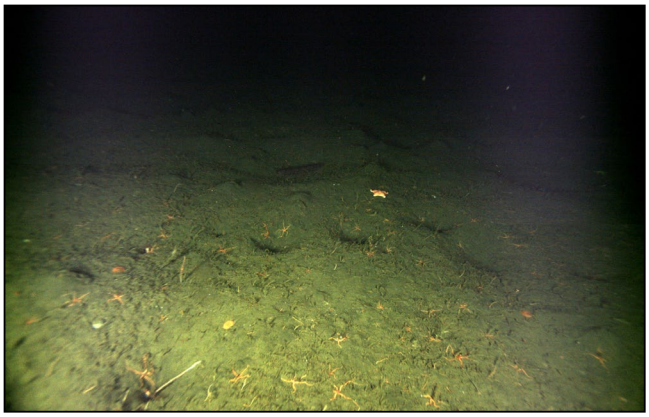






Images



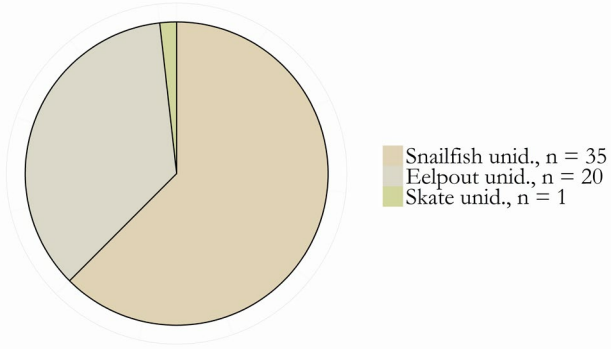


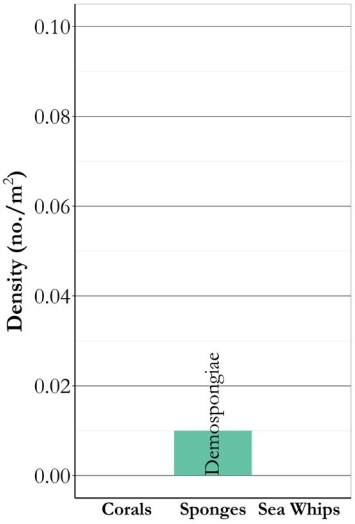
Summary - description of transect

Transect 241: Primary and secondary substrates consisted entirely of mud. Snailfishes made up almost 80% of the species identified. Fish density was 0.36 individuals/m^2. Sea whips ($n = 27$) were small (9.3 cm) with relatively low densities (0.12 individuals/m^2). No other corals or sponges were identified.

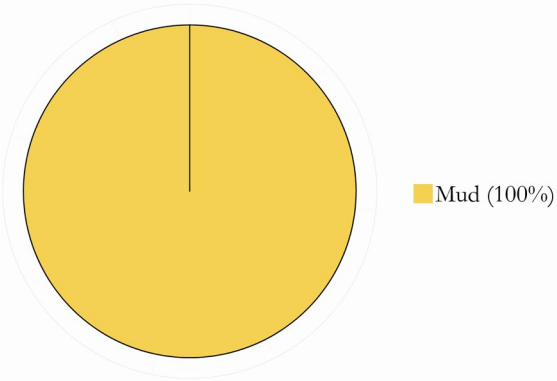
Area: Bering Canyon to Pribilof Canyon					Transect 243
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/4/14	54.82	-167.45	483	504	3.6

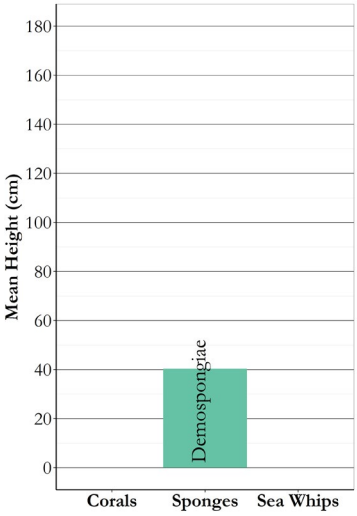
Fish and Crab Composition (n = 56)





Substrate Composition





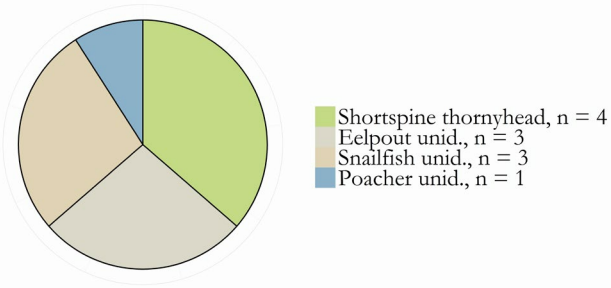
Images

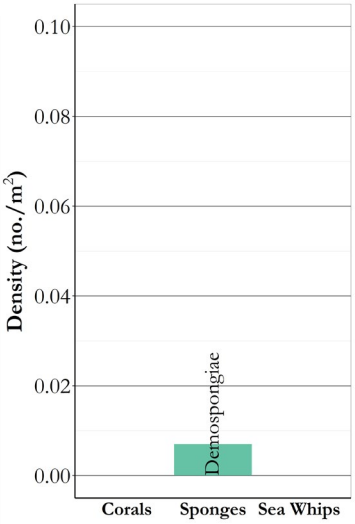
Summary - description of transect

Transect 243: Primary and secondary substrates consisted entirely of mud. Snailfish and eelpout counts combined for 98% of the fishes identified. Fish density was 0.12 individuals/m^2. Five Demospongiae were counted and two were measured. The Demospongiae mean height was 40.3 cm. No corals were identified for this transect.

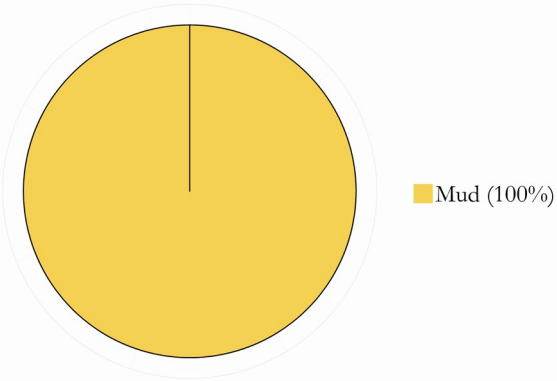
Area: Bering Canyon to Pribilof Canyon					Transect 247
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/4/14	54.53	-167.22	764	505	3.6

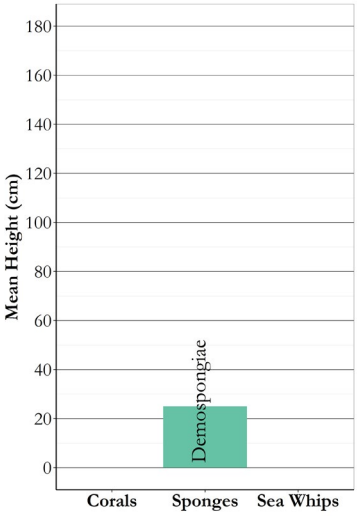
Fish and Crab Composition (n = 11)





Substrate Composition





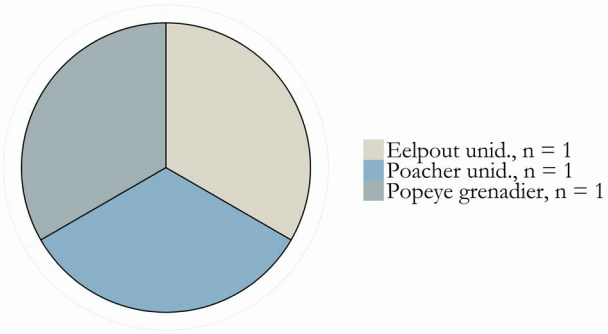
Images

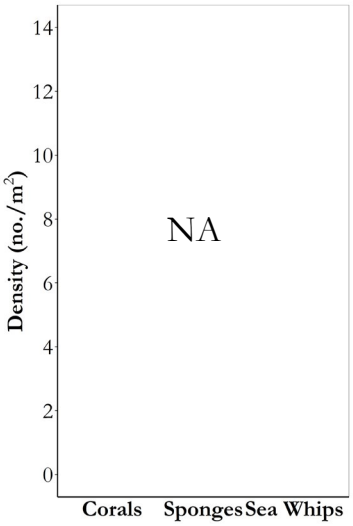
Summary - description of transect

Transect 247: Primary and secondary substrates consisted entirely of mud. The transect was almost evenly distributed between eelpouts, shortspine thornyheads, and snailfishes. Overall density for this transect was low (0.01 individuals/m^2). Five sponges were counted, and one sponge was measured at 25 cm. No corals were identified.

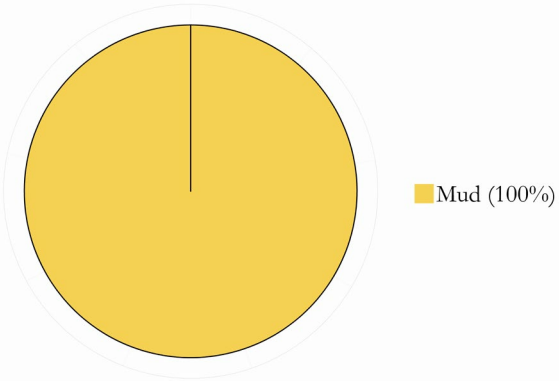
Area: Bering Canyon to Pribilof Canyon					Transect 248
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/5/14	54.53	-167.51	362	670	3.4

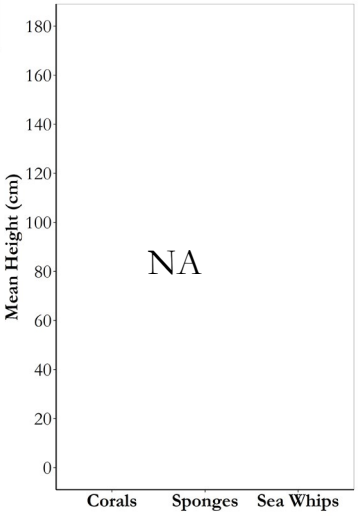
Fish and Crab Composition (n = 3)



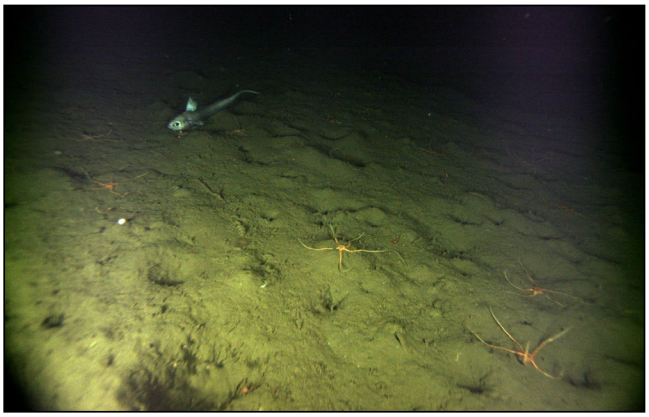


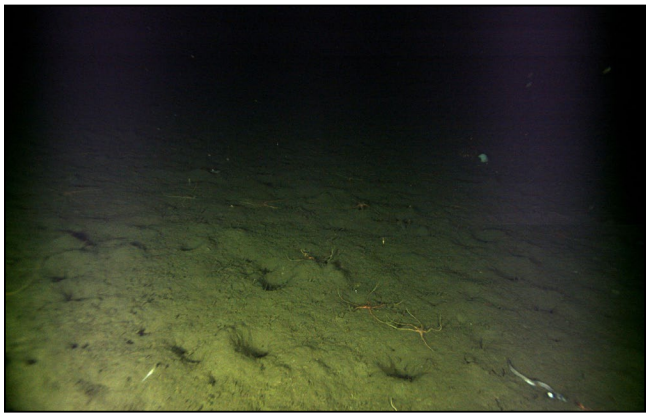
Substrate Composition





Images

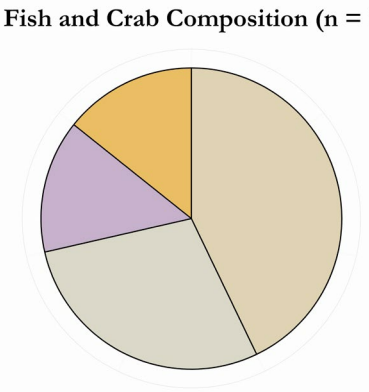


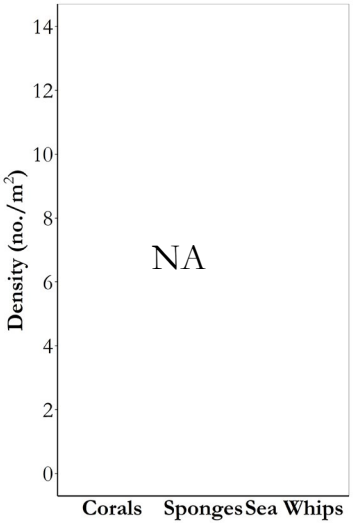


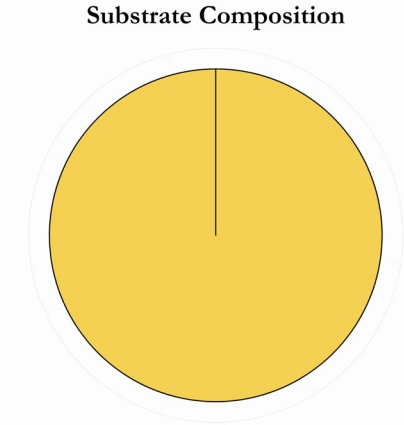
Summary - description of transect

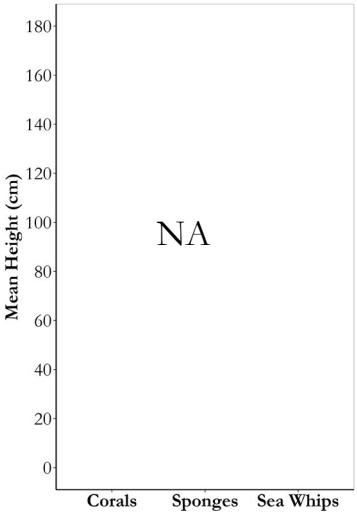
Transect 248: Primary and secondary substrates consisted entirely of mud. Only three fish were identified in this transect; an eelpout, poacher, and popeye grenadier. As a result, species density for the transect was very low (0.01 individuals/m^2). No corals or sponges were identified.

Area: Bering Canyon to Pribilof Canyon					Transect 249
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/5/14	54.42	-167.40	504	664	3.4

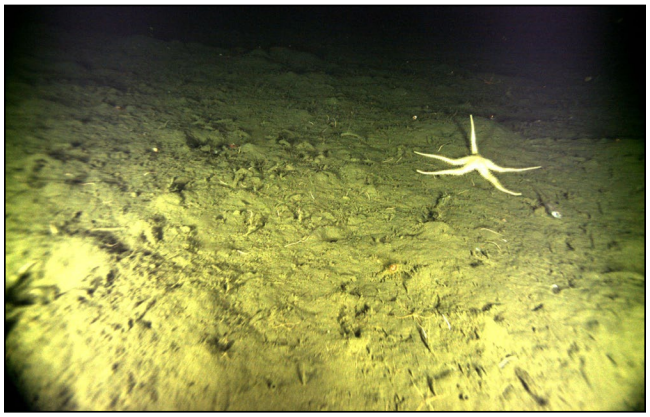








Images

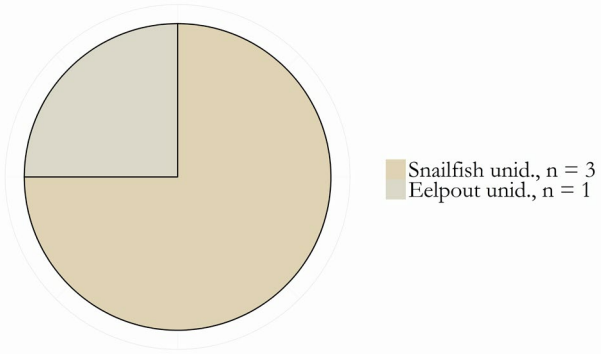


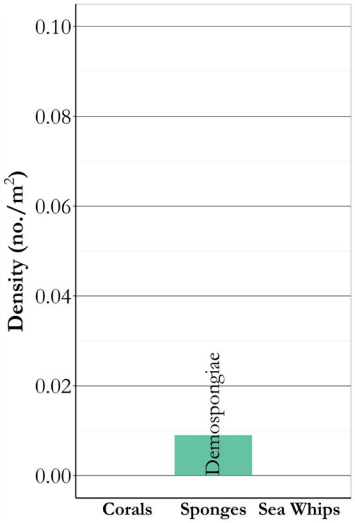
Summary - description of transect

Transect 249: Primary and secondary substrates consisted entirely of mud. Seven fish were counted resulting in a low transect density of 0.01 individuals/m^2. No sponges or corals were identified.

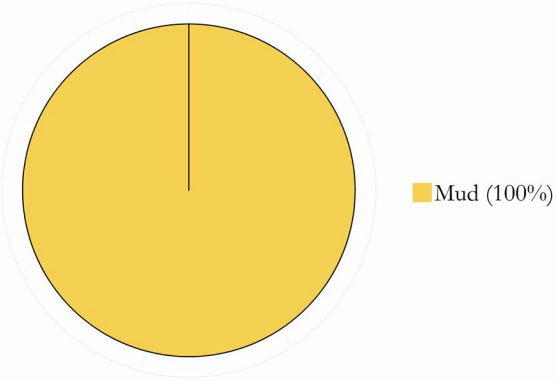
Area: Bering Canyon to Pribilof Canyon					Transect 250
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/5/14	54.42	-167.15	326	566	3.5

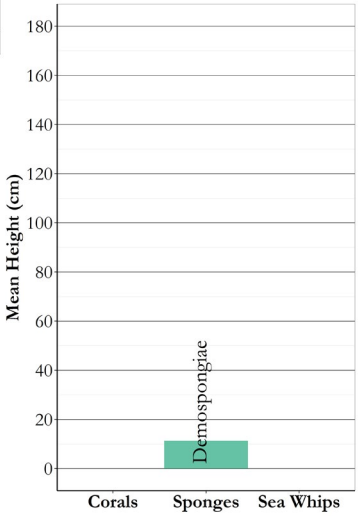
Fish and Crab Composition (n = 4)





Substrate Composition





Images

Summary - description of transect

Transect 250: Primary and secondary substrates consisted entirely of mud. Only 7 fish were identified resulting in a low density (0.01 individuals/m^2). Vertical habitat was largely absent with only three Demospongiae identified, and one measured (11.3 cm). No corals were identified.

Thirty-five transects were completed in Pribilof Canyon. Depths ranged from 93 m to 761 m. Twenty-nine taxa of fishes and crabs were identified (Table 14). Vertical habitat was dominated by Demospongiae (Table 15). Heights ranged from 2.1 cm to 61.6 cm (Table 16).

Pribilof Canyon

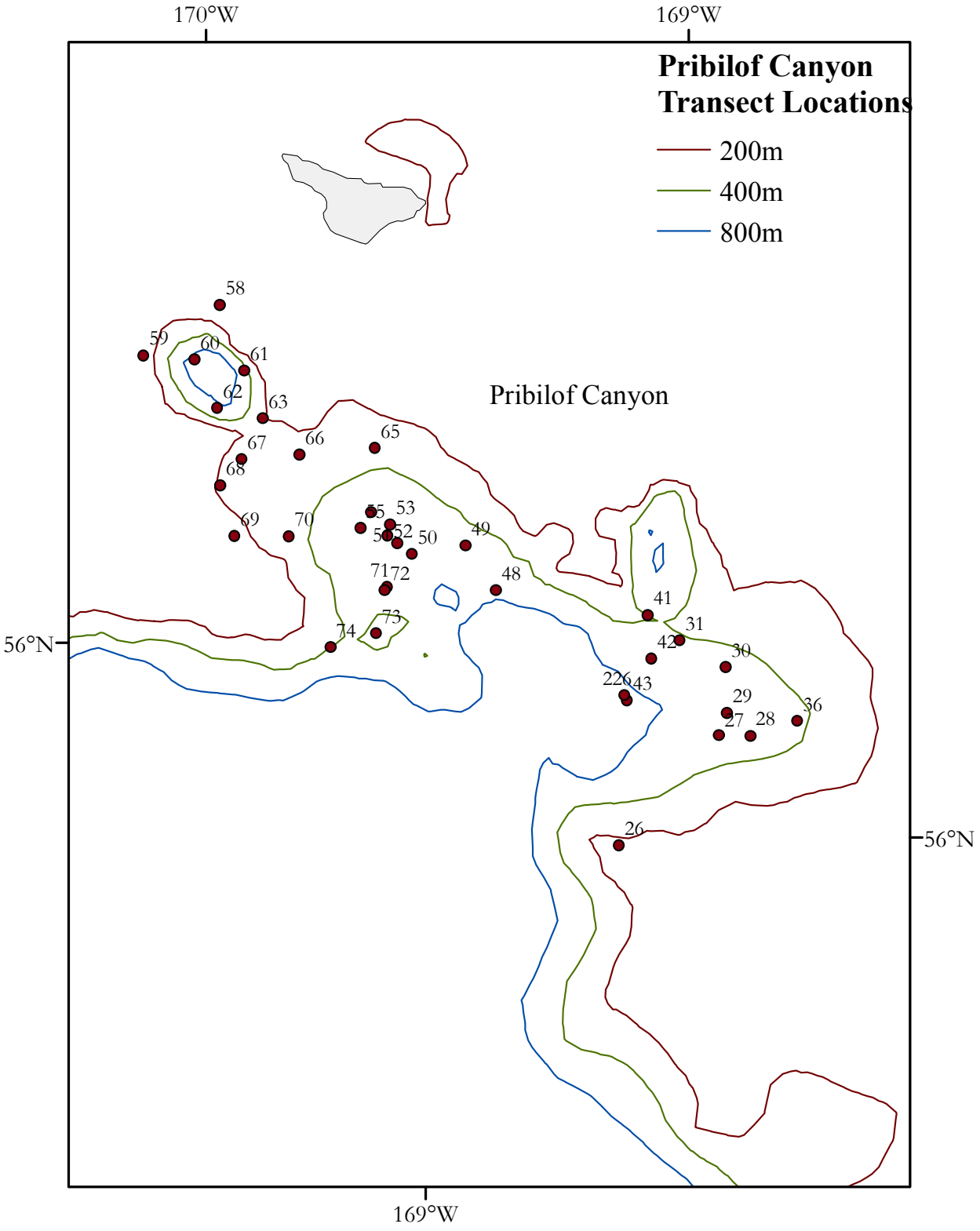


Figure 10. -- Survey transect locations, Pribilof Canyon.

SITE SUMMARY: Pribilof Canyon

Pribilof Canyon is an elongated canyon that runs parallel to the continental shelf. It is approximately 45 km wide at the shelf break with a 1,600 m relief. There are two branches in the canyon that merge at 1,500 m where the canyon turns 90 degrees and eventually merges with Bering Canyon (Karl et al. 1996).

The substrates in Pribilof Canyon were more diverse than Bering Canyon or the inter-canyon area. Over seventy percent of the observations were sand with mud or mixed coarse (Table 13). The remaining substrates were a mix of cobble, boulder, and gravel.

Golden king crabs ($n = 712$) were by far the most frequently observed species of crabs or fishes (Table 14). Ninety percent ($n = 640$) of the golden king crabs were identified in transect 54. Eelpouts, snailfishes, and *Chionoecetes* were the next most abundant. Rockfishes made up 6% of the species composition.

Twelve taxa of corals, sponges, and sea whips were identified (Table 15), more than any other region surveyed. Sponges were the most abundant with Demospongiae ($n = 4,436$) occurring at 24 of the 35 transects. Seventy-one percent of observed Demospongiae were present in transect 54. *Plumarella* and *Swiftia* were the most plentiful of the corals. Isididae were identified at three transects (53, 54, 73) in the deep water at the northwestern edge of the central canyon.

The tallest vertical structure was Demospongiae (Table 16). *Plumarella* had the largest range in heights, 3.6-52.7 cm. Corals were evenly distributed throughout the canyon (Fig. 12), while sea whips were only found in the northwest (Fig. 11). Demospongiae were also evenly distributed but Hexactinellida was only identified in the northwest and Calcarea was only seen in the southeast (Fig. 13).

Table 13. -- Summary of substrates observed at transects (n = 35) in Pribilof Canyon.

Substrate	Depth range (m)	Number of transects with observed substrate	Percent of observations
Sand.mud	93 - 761	20	47%
Mixed coarse	188 - 760	14	33%
Sand*	502 - 717	4	11%
Sand.gravel	215 - 659	3	3%
Mixed coarse.cobble	201 - 446	4	3%
Sand.mixed coarse	399 - 399	1	2%
Mixed coarse.boulder	188 - 532	7	1%
Sand.cobble	181 - 659	3	<1%
Cobble*	188 - 435	2	<1%
Cobble.boulder	188 - 435	2	<1%
Cobble.mixed coarse	435 - 760	2	<1%
Sand.boulder	181 - 659	2	<1%
Mixed coarse.low bedrock	532 - 532	1	<1%
Boulder.mixed coarse	532 - 532	1	<1%
Gravel.mixed coarse	394 - 394	1	<1%
Mixed coarse.gravel	524 - 524	1	<1%

*Primary and secondary substrates were the same.

Table 14. -- Summary of fishes and crabs identified at transects (n = 35) in Pribilof Canyon.

Species/Grouping	Number of occurrences	Number of transects with occurrences	Mean transect depth range (m)	Mean density (individuals/m^2)
Golden king crab	712	17	188 - 533	0.01
Eelpout unid.	267	23	93 - 761	0.01
Snailfish unid.	141	19	115 - 761	0.01
Chionoecetes sp.	129	9	93 - 760	0.01
Sculpin unid.	68	25	178 - 761	<0.01
Poacher unid.	64	13	115 - 550	<0.01
Skate unid.	60	23	115 - 761	<0.01
Flatfish unid.	59	21	93 - 761	<0.01
Shortspine thornyhead	53	11	349 - 659	<0.01
Roundfish unid.	48	17	178 - 761	<0.01
Searcher unid.	26	5	178 - 215	<0.01
Shortraker rockfish	23	6	327 - 532	<0.01
King crab unid.	22	9	188 - 761	<0.01
Arrowtooth/Kamchatka flounder	22	14	126 - 659	<0.01
Giant grenadier	19	7	435 - 761	<0.01
Pacific halibut	18	9	188 - 520	<0.01
Crab unid.	17	6	178 - 659	<0.01
Walleye pollock	17	5	261 - 394	<0.01
Rockfish unid.	16	11	188 - 532	<0.01
Pacific ocean perch	15	6	188 - 327	<0.01
Rex sole	9	6	261 - 520	<0.01
Flathead sole	5	4	93 - 279	<0.01
Pacific cod	3	2	105 - 178	<0.01
Greenland turbot	2	2	435 - 446	<0.01
Scarlet king crab	2	1	761 - 761	<0.01
Rougheye rockfish	2	1	215 - 215	<0.01
Cod/pollock unid.	1	1	261 - 261	<0.01
Grenadier unid.	1	1	550 - 550	<0.01

Table 15. -- Summary of coral, sponge, and sea whip taxa identified at transects (n = 35) in Pribilof Canyon.

Species/Grouping	Number of occurrences	Number of transects with occurrences	Mean transect depth range (m)	Mean density (individuals/m^2)
Demospongiae	4,436	1,165	178 761	0.09
Plumarella sp.	639	945	201 761	0.03
Swiftia sp.	522	716	264 761	0.03
Hexactinellida	290	623	188 761	0.02
Halipteris sp.	90	424	261 520	0.01
Demospongiae (damaged)	48	41	215 215	0.03
Primnoidae	37	243	264 760	0.01
Calcarea	31	165	215 532	<0.01
Porifera	16	288	188 761	<0.01
Halipteris sp. (damaged)	11	181	115 533	<0.01
Isididae	7	180	349 446	<0.01
Plexauridae	1	42	532 532	<0.01

**Halipteris* sp. (damaged) is not accounted for in the *Halipteris* sp. grouping.

Table 16. -- Summary of coral, sponge, and sea whip mean heights from transects completed in Pribilof Canyon.

Species/Grouping	Number measured	Mean height (cm)	Minimum height (cm)	Maximum height (cm)
Demospongiae	473	16.9	10.0	61.6
Plumarella sp.	202	15.5	3.6	52.7
Hexactinellida	90	20.4	10.1	58.6
Halipteris sp.	53	16.0	2.9	54.0
Swiftia sp.	40	10.0	2.1	23.6
Primnoidae	19	10.6	3.8	33.0
Calcarea	12	13.1	10.2	18.2
Isididae	5	16.0	9.7	21.5
Porifera	2	14.3	13.3	15.3
Halipteris willemoesi	1	52.2	52.2	52.2
Plexauridae	1	15.9	15.9	15.9

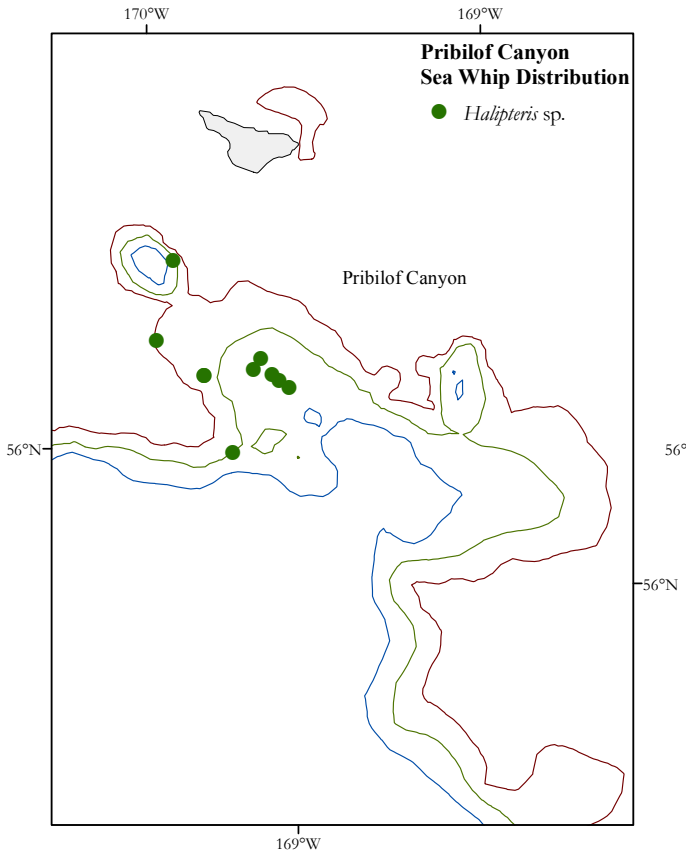


Figure 11. -- Sea whip distribution, Bering Canyon to Pribilof Canyon.

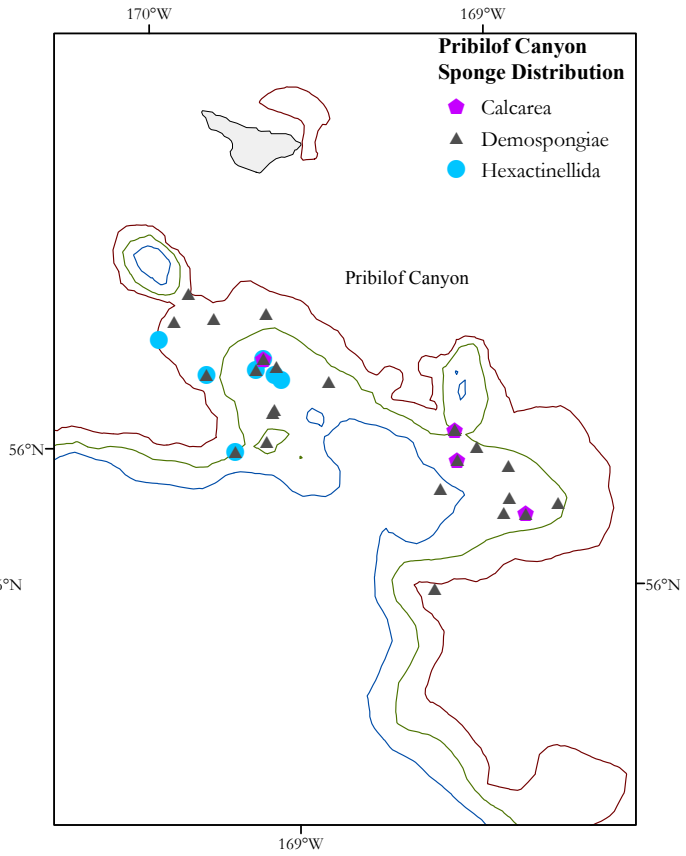


Figure 13. -- Sponge distribution, Bering Canyon to Pribilof Canyon.

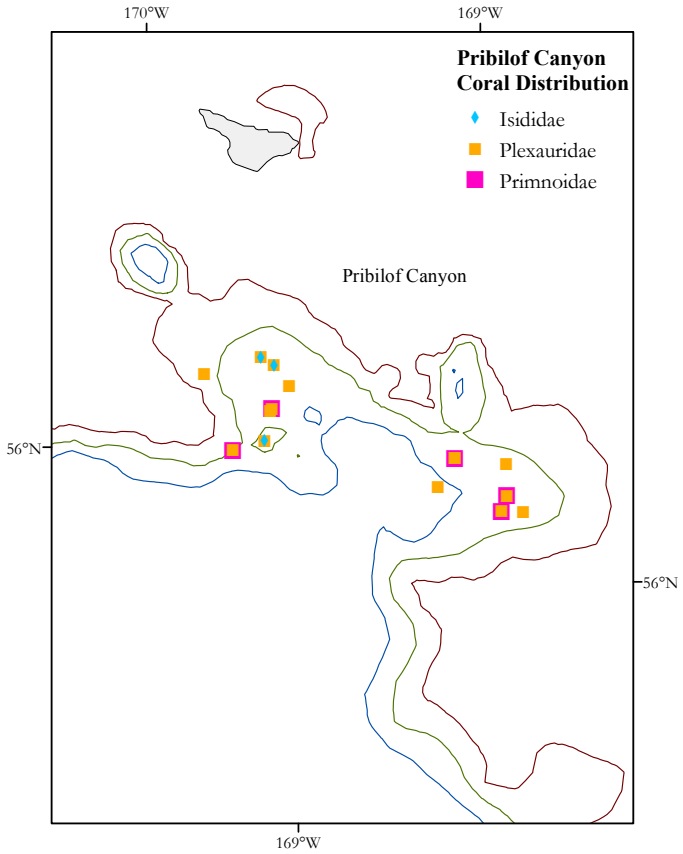
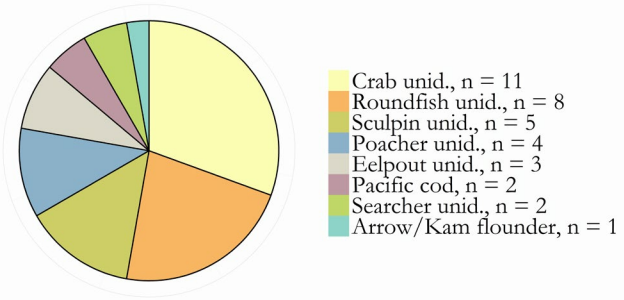
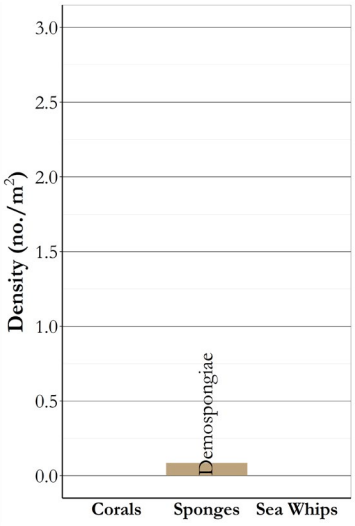


Figure 12. -- Coral distribution, Bering Canyon to Pribilof Canyon.

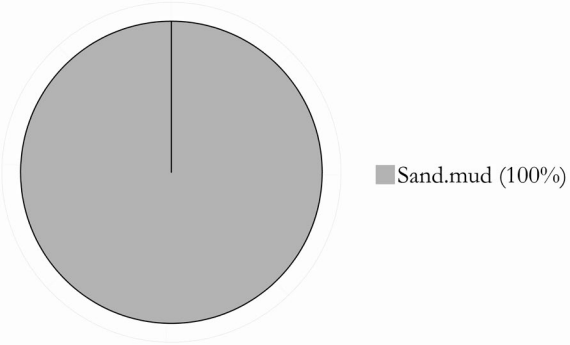
Area: Pribilof Canyon					Transect 26
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/13/14	55.92	-168.77	1,437	178	4.0

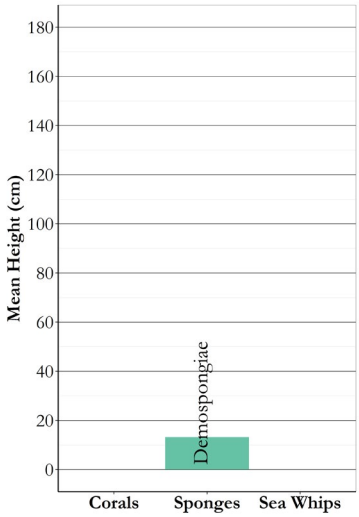
Fish and Crab Composition (n = 36)



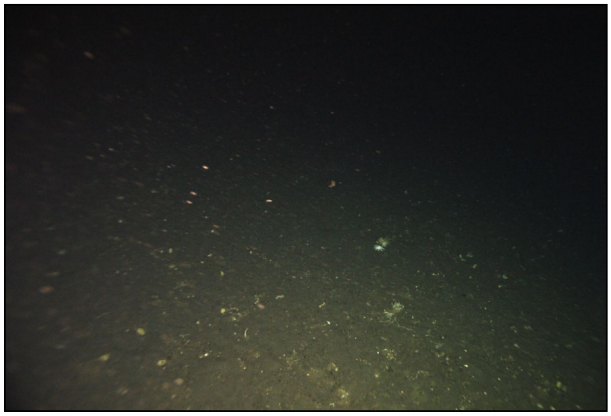


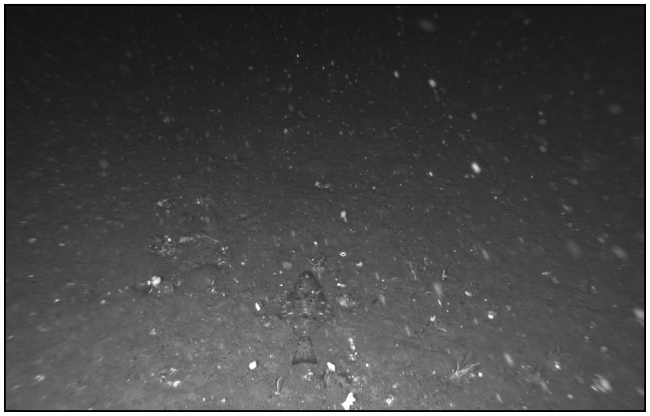
Substrate Composition





Images



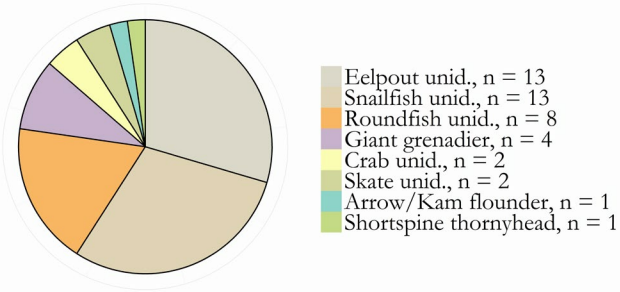


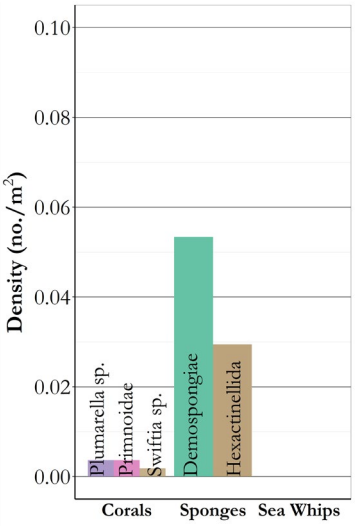
Summary - description of transect

Transect 26: Primary and secondary substrates consisted entirely of sand and mud. Thirty-six individuals were identified and 31% of them were crabs. Sculpins, poachers, and unidentified roundfishes accounted for 47% of the observations. Species density was 0.03 individuals/m^2. Vertical habitat was composed of 123 Demospongiae. The mean height for five measured sponges was 13.2 cm. No corals were found.

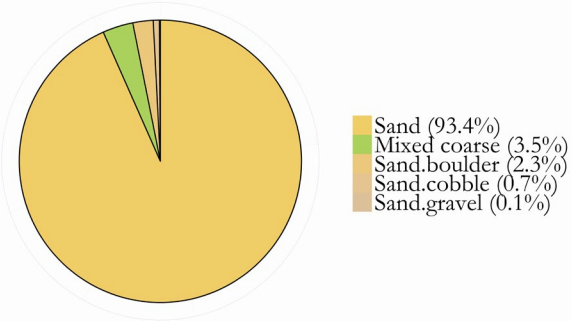
Area: Pribilof Canyon					Transect 27
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/13/14	56.07	-168.61	1,087	659	3.4

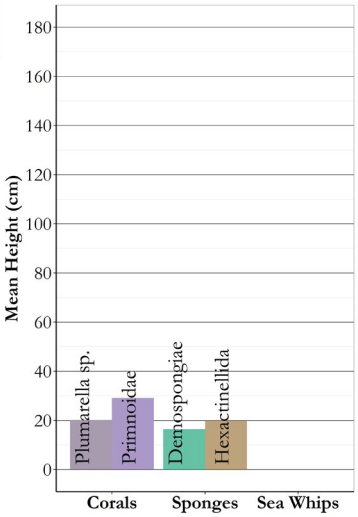
Fish and Crab Composition (n = 44)



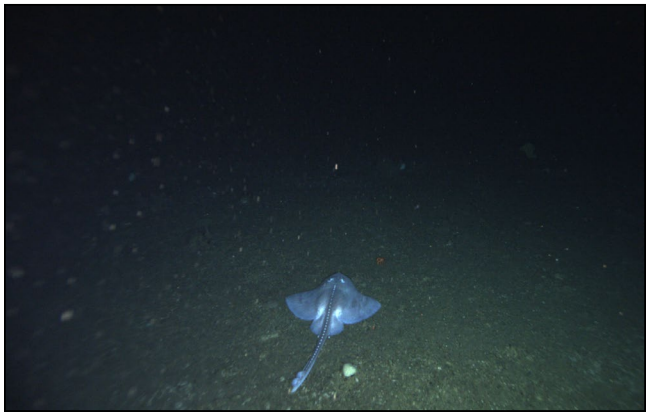


Substrate Composition





Images

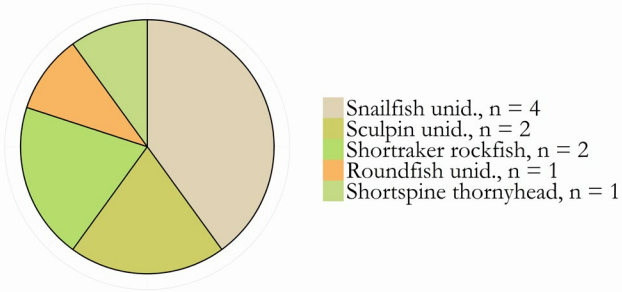


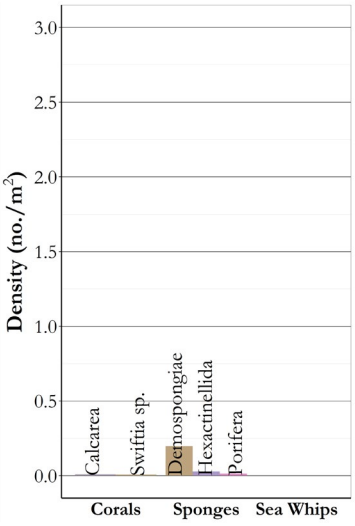
Summary - description of transect

Transect 27: Primary and secondary substrates consisted predominantly of sand. Small patches of sand/boulder and mixed coarse were seen as well. Fish and crab density was 0.04 individuals/m^2. Eelpouts ($n = 13$) and snailfishes ($n = 13$) were the dominant taxa (60%). Vertical habitat consisted of eight Primnoidae (4 *Plumarella* sp.) as well as two *Swiftia* sp. In addition, 58 Demospongiae and 32 Hexactinellida were identified. Four *Plumarella* sp. were measured and their mean height was 20.1 cm. One unidentified primnoid measured 29.1 cm. The mean heights for 11 Demospongiae and 9 Hexactinellida were 16.4 cm and 19.9 cm, respectively. The vertical habitat density for the transect was 0.09 individuals/m^2. No sea whips were found.

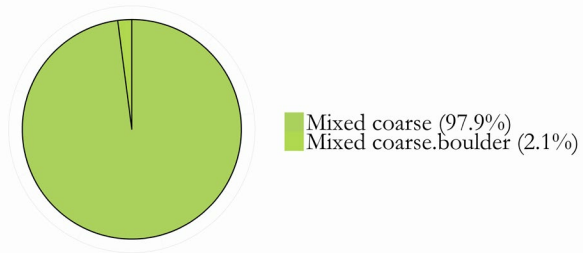
Area: Pribilof Canyon					Transect 28
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/13/14	56.08	-168.55	896	529	3.7

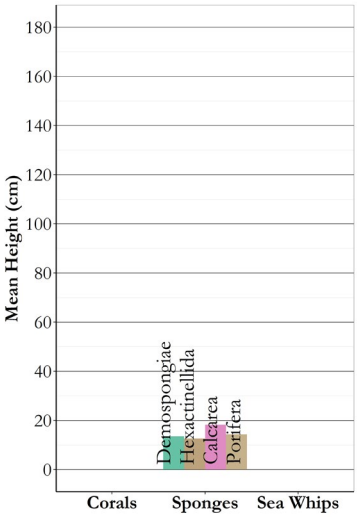
Fish and Crab Composition (n = 10)





Substrate Composition





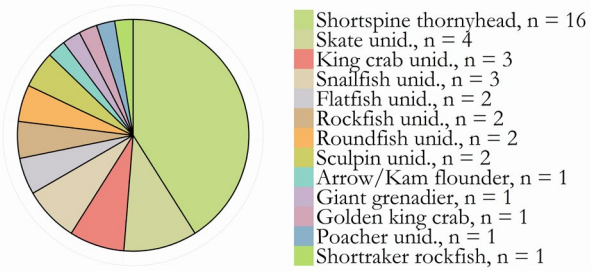
Images

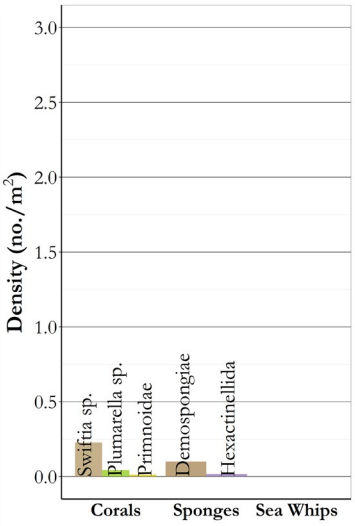
Summary - description of transect

Transect 28: Primary and secondary substrates were almost entirely mixed coarse. Only 10 fish were found and snailfishes made up 40% of them. Fish density was low (0.01 individuals/m^2). Coral density was < 0.01 individuals/m^2, and consisted of 7 *Swiftia* sp. The vertical habitat also contained 223 sponges (12 unknown, 8, Calcarea, 178 Demospongiae, 25 Hexactinellida). Sponge density was 0.26 individuals/m^2. Measurements were collected from 21 Demospongiae, 6 Hexactinellida, 2 unknown sponges, and 1 Calcarea. Correspondingly, mean heights were 13.5 cm, 12.6 cm, 14.3 cm, and 18.2 cm. No sea ships were identified.

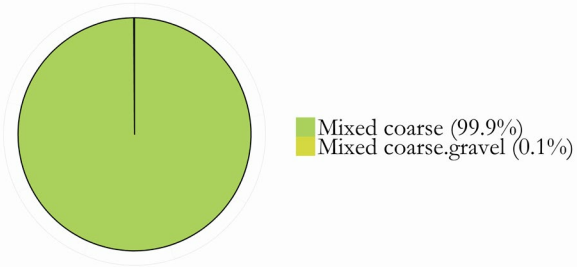
Area: Pribilof Canyon					Transect 29
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/14/14	56.10	-168.61	799	524	3.7

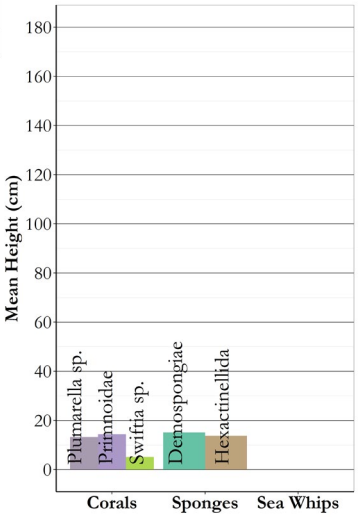
Fish and Crab Composition (n = 39)





Substrate Composition





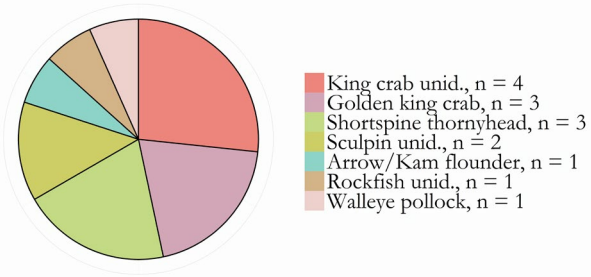
Images

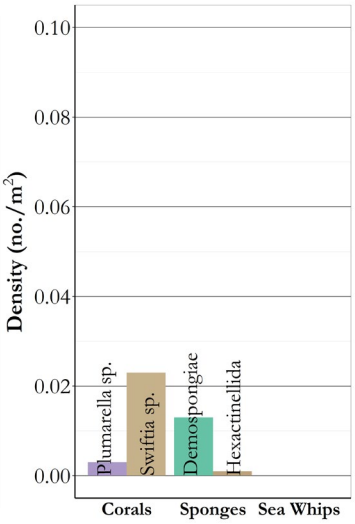
Summary - description of transect

Transect 29: Primary and secondary substrates were almost entirely mixed coarse and gravel. Of the 39 fishes and crabs identified, 41% were shortspine thornyheads. Four skates and four king crabs were also identified. Species density was 0.05 individuals/m^2. Vertical habitat was composed of *Plumarella* sp. ($n = 35$), unknown primnoid ($n = 10$), *Swiftia* sp. ($n = 182$), Demospongiae ($n = 80$), and Hexactinellida ($n = 14$). Total coral and sponge density was 0.40 individuals/m^2. Mean heights for all vertical habitats did not exceed 15 cm. No sea whips were identified.

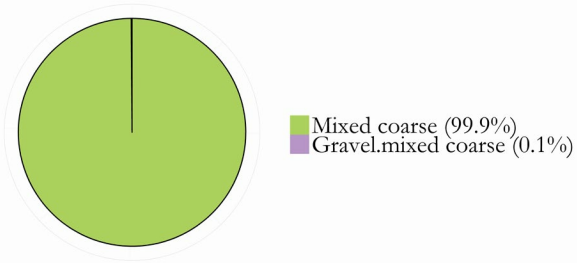
Area: Pribilof Canyon					Transect 30
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/14/14	56.15	-168.63	1,829	394	3.8

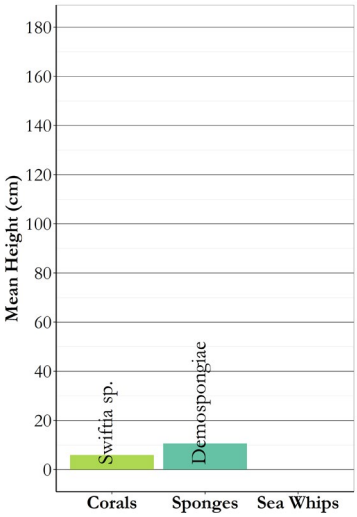
Fish and Crab Composition (n = 15)



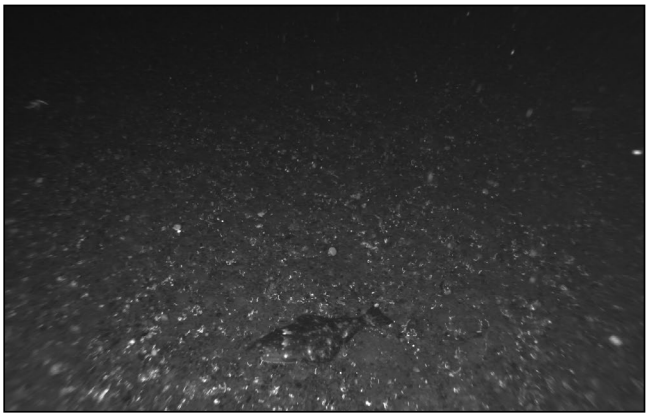


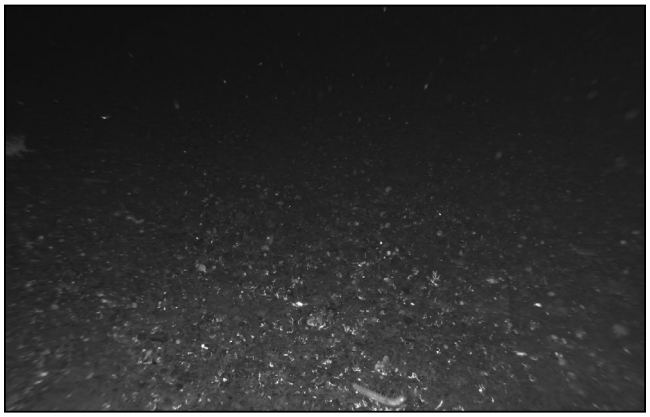
Substrate Composition





Images



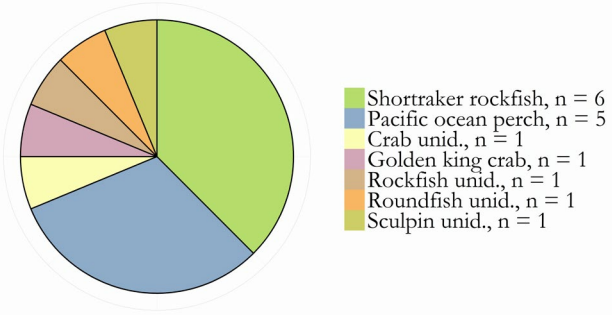


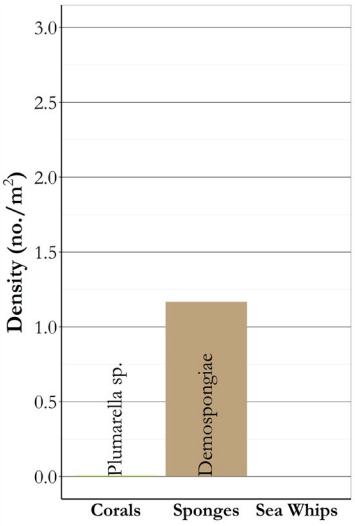
Summary - description of transect

Transect 30: Primary and secondary substrates were almost entirely mixed coarse. Fifteen fishes and crabs were identified and 47% of them were king crabs. Shortspine thornyheads were the most abundant fish. Species density was low (0.008 individuals/m^2). Vertical habitat density was 0.04 individuals/m^2, and consisted of 42 *Swiftia* sp., 5 *Plumarella* sp., 23 Demospongiae, and 2 Hexactinellida. Mean height for 4 Demospongiae was 10.6 cm. Two *Swiftia* were measured and their mean height was 5.9 cm. No sea whips were identified.

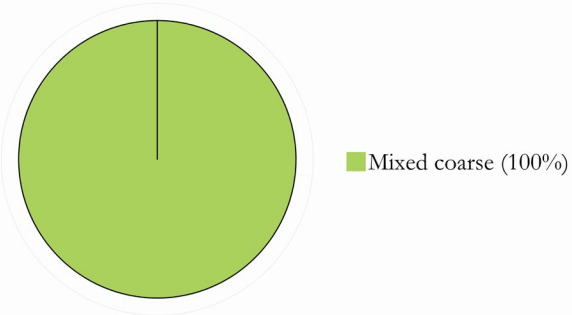
Area: Pribilof Canyon					Transect 31
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/14/14	56.17	-168.74	2,713	327	3.9

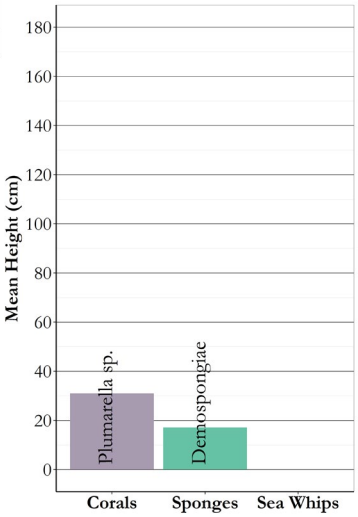
Fish and Crab Composition (n = 16)





Substrate Composition





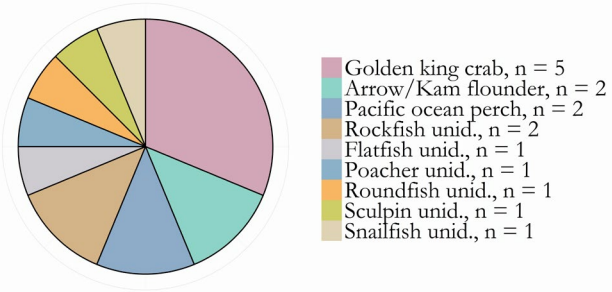
Images

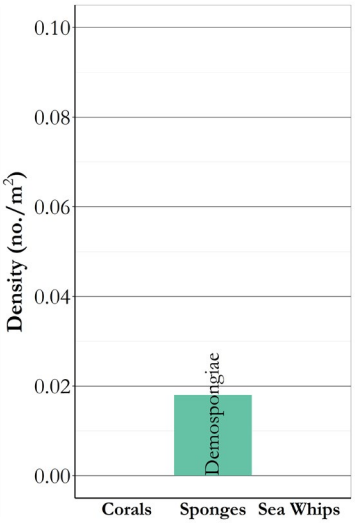
Summary - description of transect

Transect 31: Primary and secondary substrates were almost entirely mixed coarse. Of the 16 fishes and crabs identified, 38% were shortraker rockfishes and another 31% were Pacific ocean perch. Species density was 0.01 individuals/m^2. Vertical habitat was composed of *Plumarella* sp. ($n = 18$), and Demospongiae ($n = 3{,}167$). Total coral and sponge density was 1.17 individuals/m^2. Mean heights for 173 measured Demospongiae was 17.1 cm. Nine *Plumarella* sp were measured (31.0 cm). No sea whips were identified.

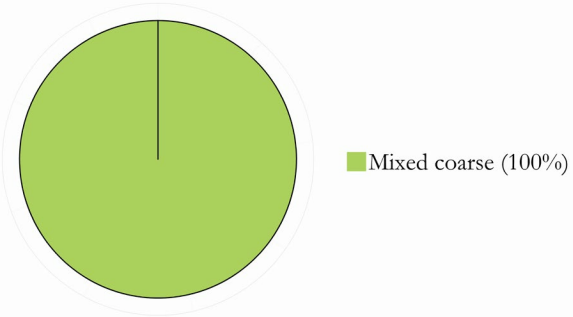
Area: Pribilof Canyon					Transect 36
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/14/14	56.10	-168.46	621	309	3.9

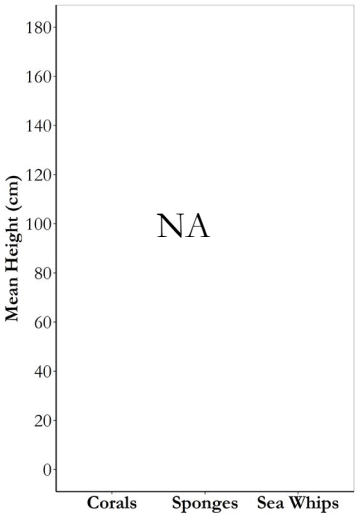
Fish and Crab Composition (n = 16)



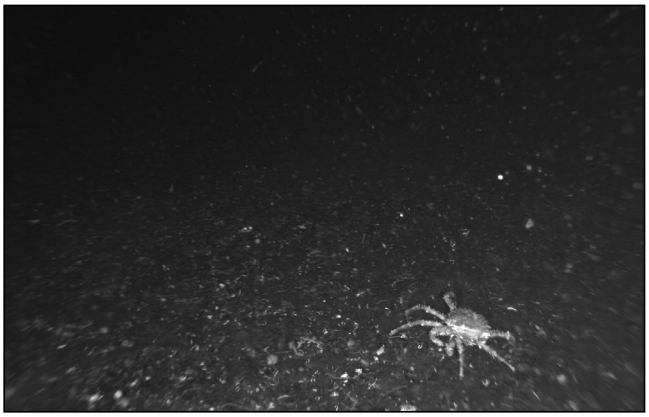


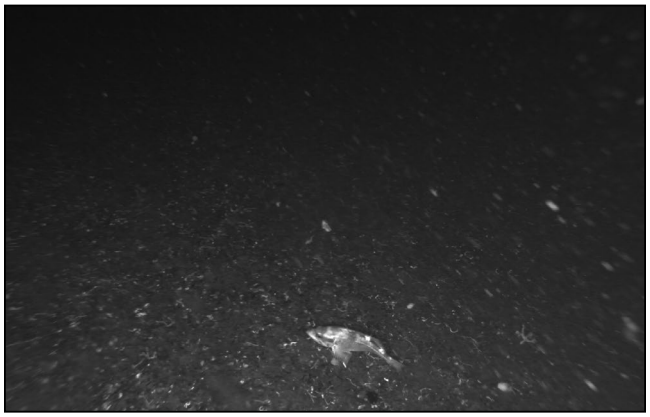
Substrate Composition





Images



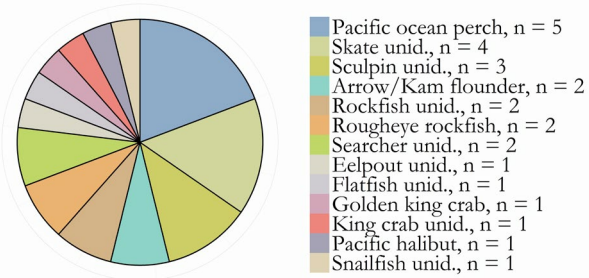


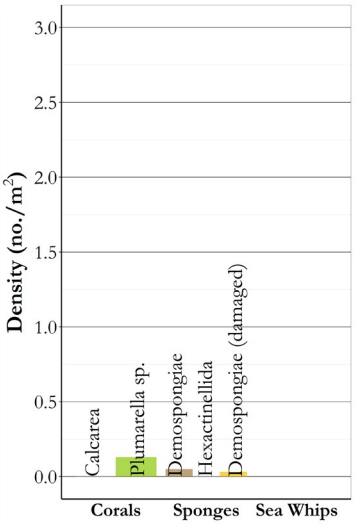
Summary - description of transect

Transect 36: Primary and secondary substrates consisted entirely of mixed coarse sediments. Species density was 0.03 individuals/m^2, and was comprised largely of golden king crabs, *Lithodes aequespina*, ($n = 5$). Arrowtooth/ Kamchatka flounders, other rockfishes, and Pacific ocean perch ($n = 2$), respectively were the next most abundant taxa identified. Vertical habitat density consisted of 11 Demospongiae (0.02 individuals/m^2).

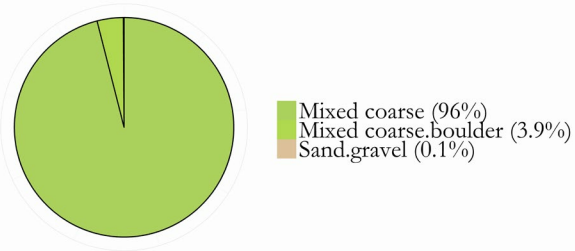
Area: Pribilof Canyon					Transect 41
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/15/14	56.19	-168.81	1,512	215	4.0

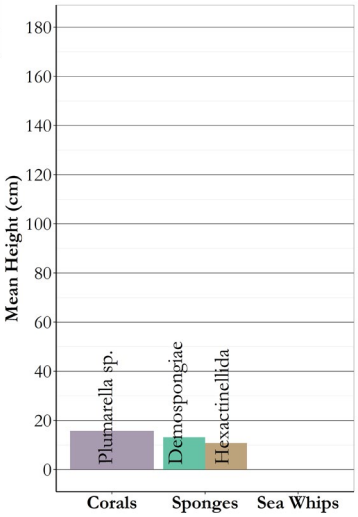
Fish and Crab Composition (n = 26)



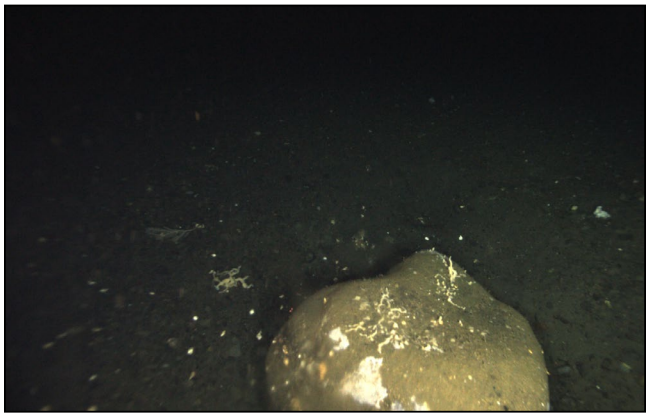


Substrate Composition





Images

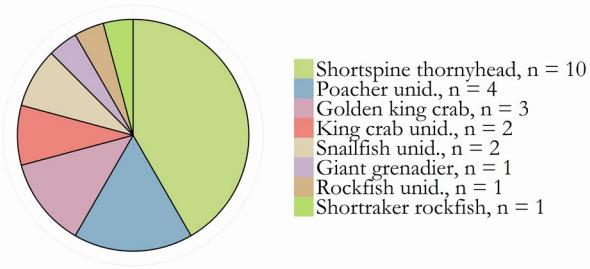


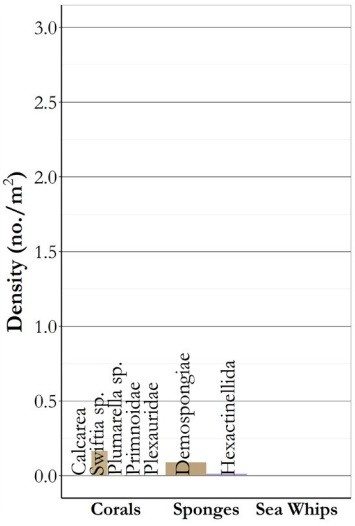
Summary - description of transect

Transect 41: Primary and secondary substrates consisted largely of mixed coarse sediments, with approximately 5% of the transect composed of mixed coarse/boulder or sand/gravel sediments. Only 26 individual fish were counted, and Pacific ocean perch, sculpins, and skates comprised 46% of species identified. Species density was 0.02 individuals/m^2. Vertical habitat consisted of 196 *Plumarella* sp., 124 Demospongiae (48 damaged), 4 Hexactinellida, and 3 Calcarea. Sponge and coral density was 0.22 individuals/m^2. No sea whips were identified.

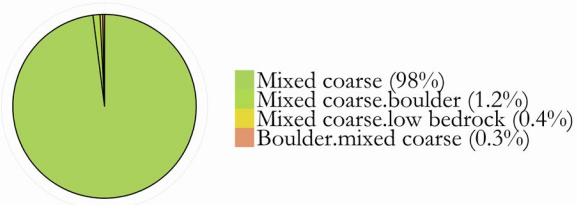
Area: Pribilof Canyon					Transect 42
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/15/14	56.14	-168.79	1,298	532	3.6

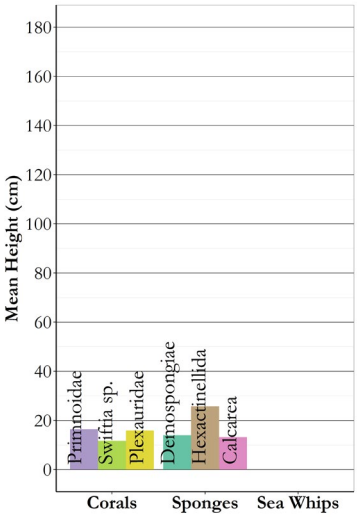
Fish and Crab Composition (n = 24)





Substrate Composition



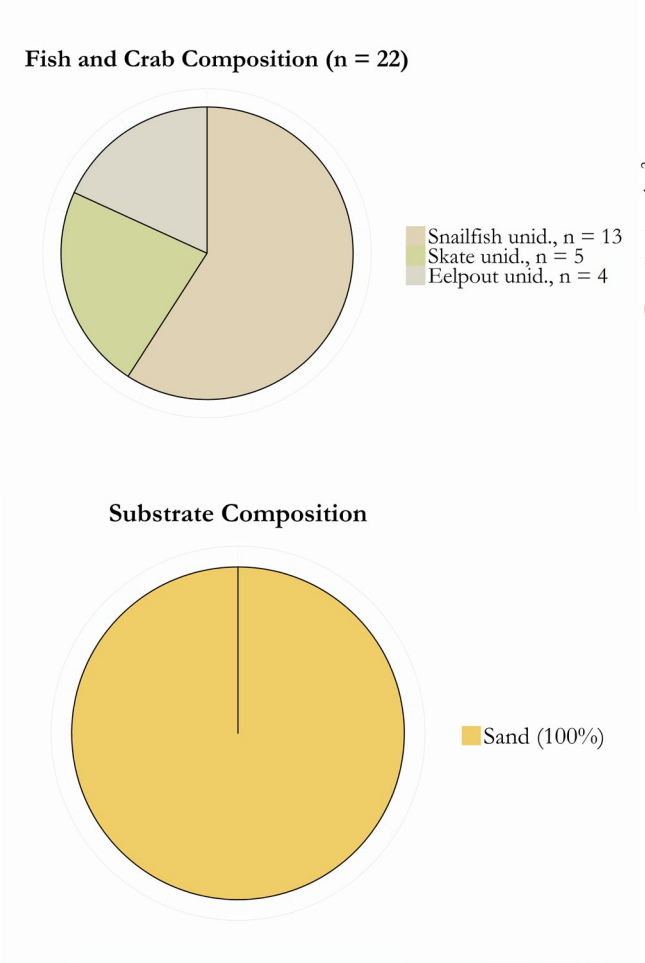


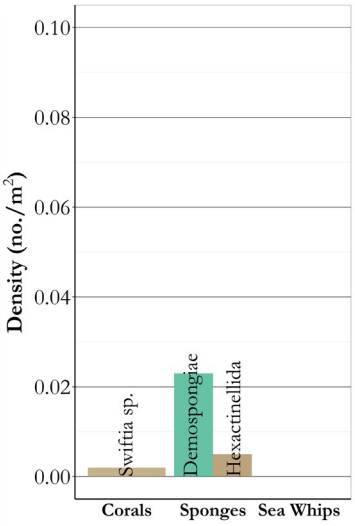
Images

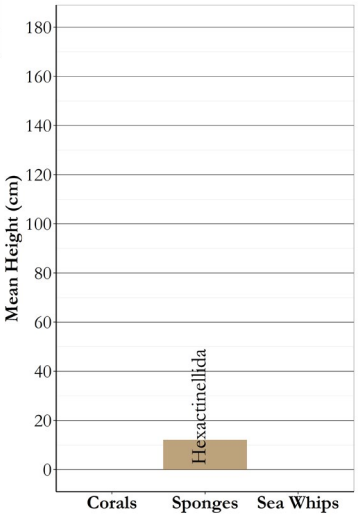
Summary - description of transect

Transect 42: Primary and secondary substrates consisted largely of mixed coarse sediments. Fish and crab density was 0.02 individuals/m^2. Shortspine thornyheads were the most abundant. Vertical habitat was composed of 220 corals (Plexauridae, *Plumarella* sp., Primnoidae, and *Swiftia* sp.) and 134 sponges (Calcarea, Demospongiae, and Hexactinellida). Coral density was 0.17 individuals/m^2, and sponge density was 0.10 individuals/m^2. Two Hexactinellida were measured (25.7 cm) and 45 Demospongiae (13.9 cm). Two Calcarea had a mean height of 13.2, and the coral mean heights did not exceed 17 cm. No sea whips were identified.

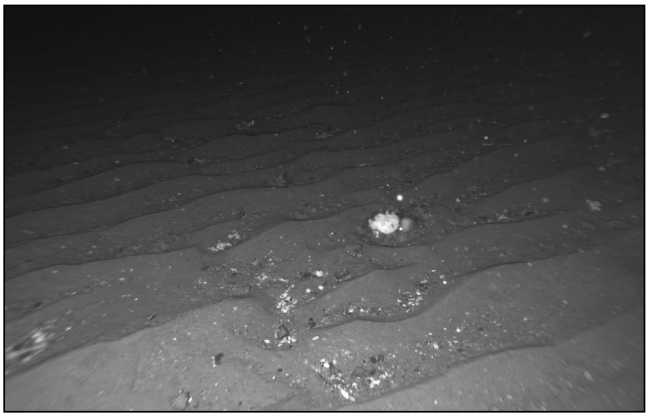
Area: Pribilof Canyon					Transect 43
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/15/14	56.08	-168.82	598	714	3.4







Images

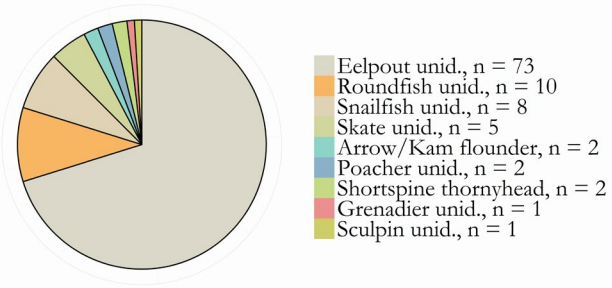


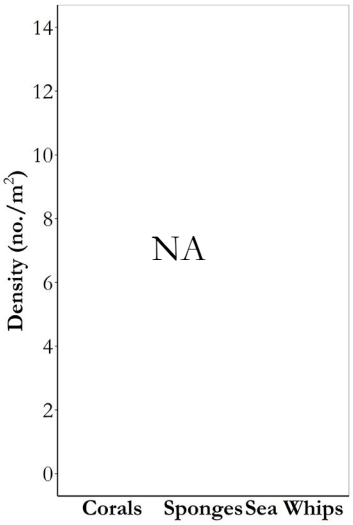
Summary - description of transect

Transect 43: Primary and secondary substrates consisted entirely of sand. Only 22 individuals were counted, and over half (59%) were snailfishes. Skates ($n = 5$) and eelpouts ($n = 4$) were the only other species identified. Fish density was 0.04 individuals/m^2. Vertical habitat consisted of 14 Demospongiae, 3 Hexactinellida, and 1 coral (*Swiftia* sp). Coral and sponge density was 0.03 individuals/m^2. The mean height for 2 measured Hexactinellida was 12.1 cm. No sea whips were identified.

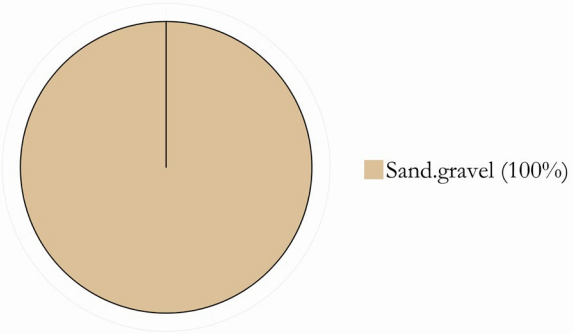
Area: Pribilof Canyon					Transect 48
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/15/14	56.18	-169.14	901	550	3.7

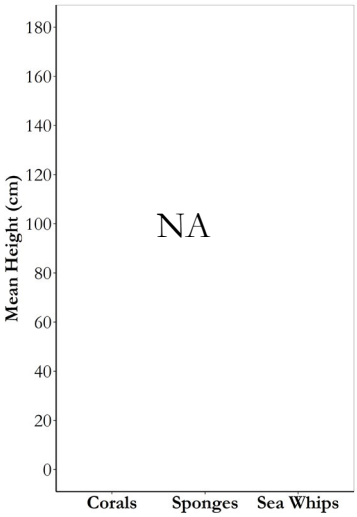
Fish and Crab Composition (n = 104)





Substrate Composition



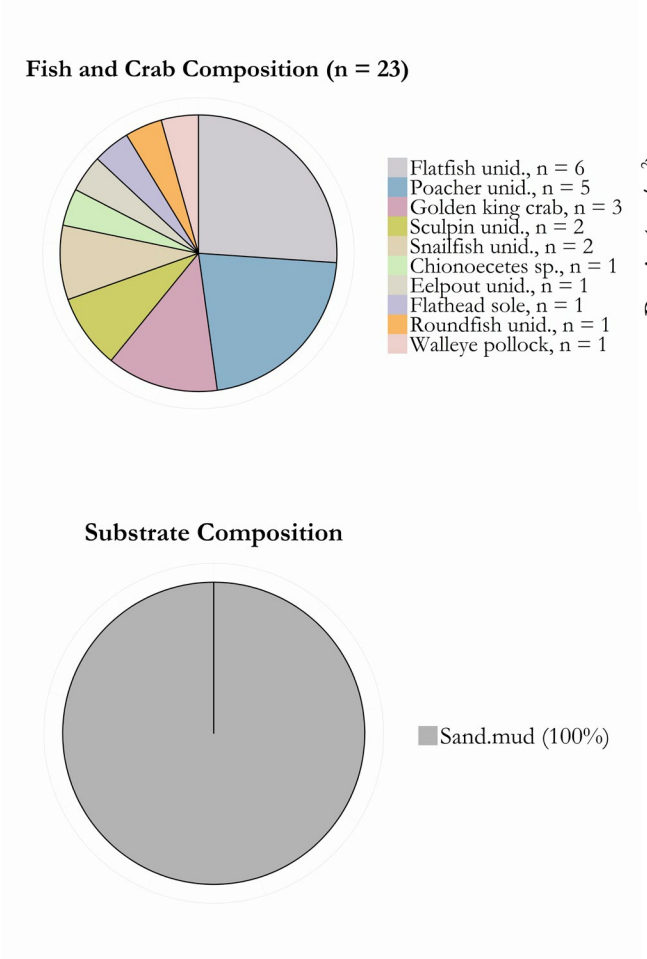


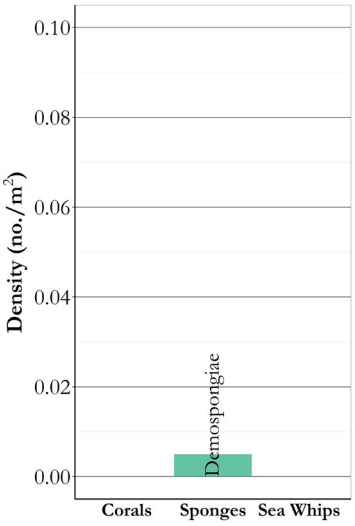
Images

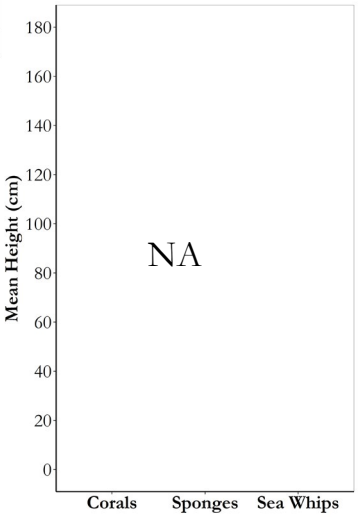
Summary - description of transect

Transect 48: Primary and secondary substrates consisted entirely of sand and gravel. Of the 104 individuals identified, 70% of them were eelpouts. Unidentified roundfishes accounted for another 10% of the observations. Fish density was 0.12 individuals/m^2. No vertical habitat was identified.

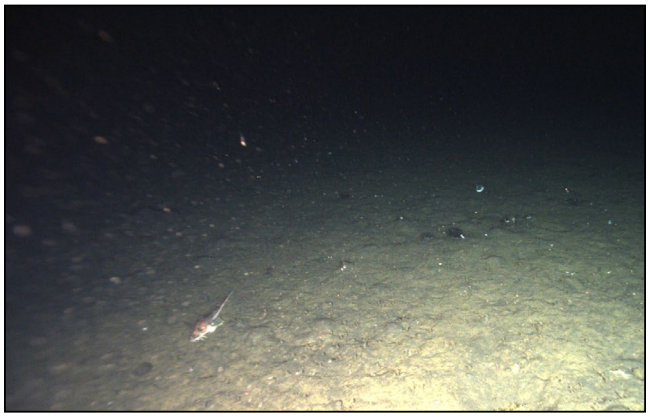
Area: Pribilof Canyon					Transect 49
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/15/14	56.22	-169.22	1,051	279	3.9







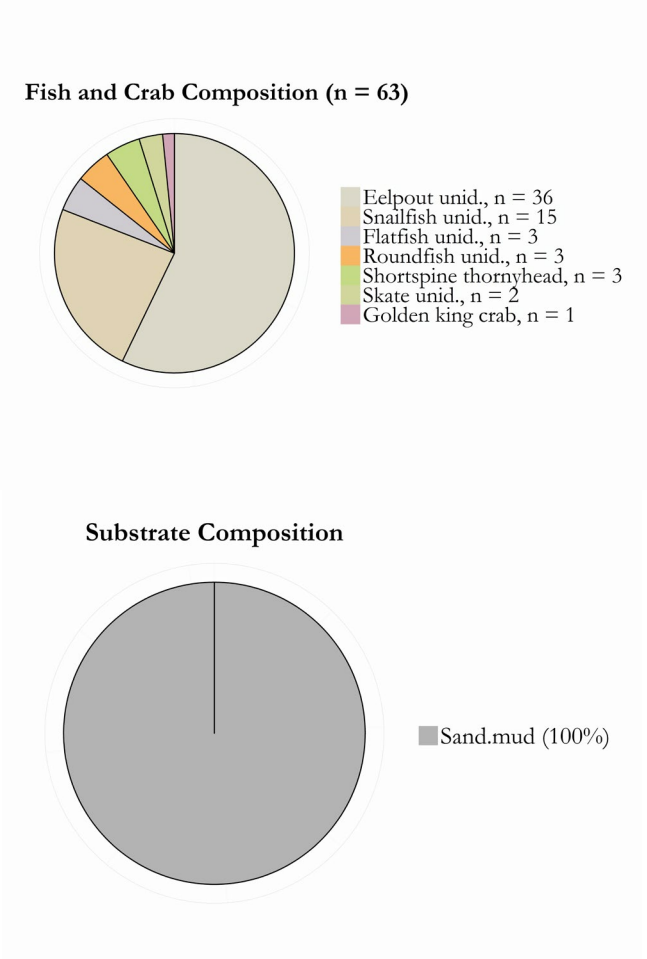
Images

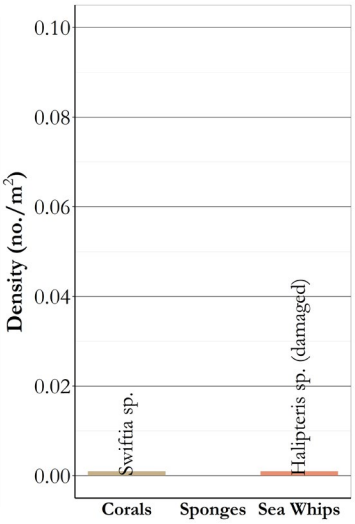


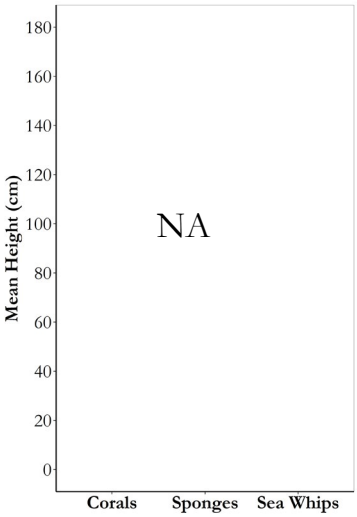
Summary - description of transect

Transect 49: Primary and secondary substrates consisted entirely of sand and mud. Of the 23 individuals identified, 52% of them were flatfishes and poachers. Crabs accounted for another 17% of the observations. Crab and fish density was 0.02 individuals/m^2. Five Demospongiae were identified. No corals were seen.

Area: Pribilof Canyon					Transect 50
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/15/14	56.19	-169.32	1,308	533	3.5





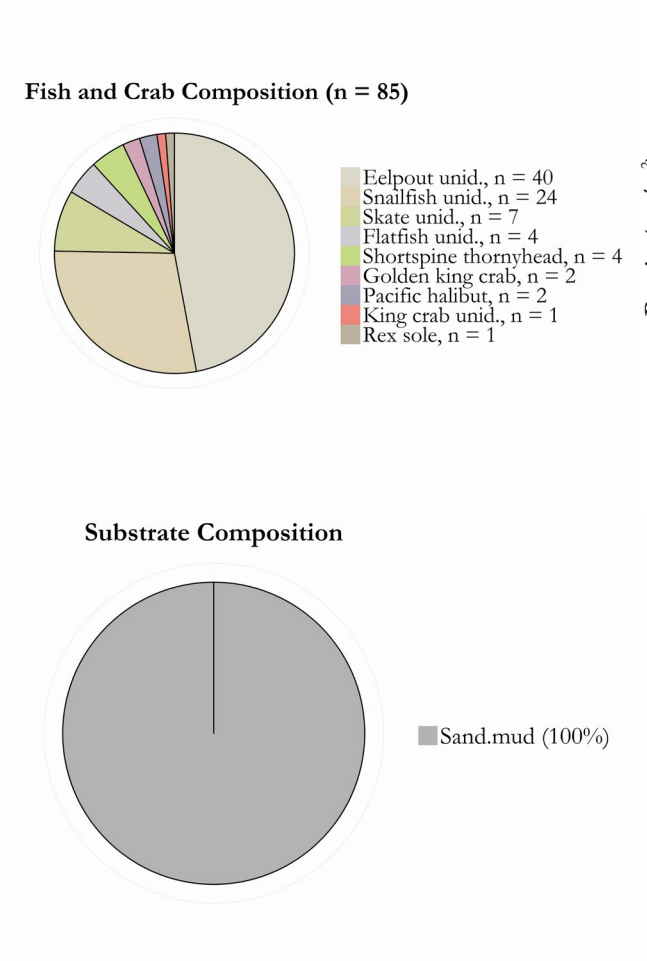


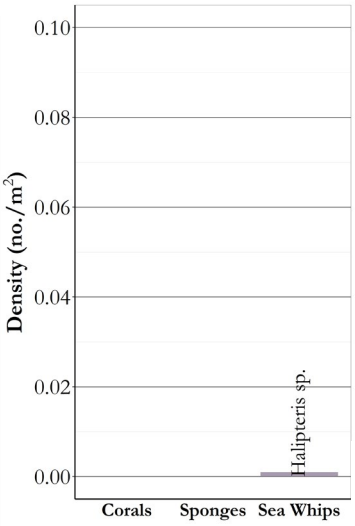
Images

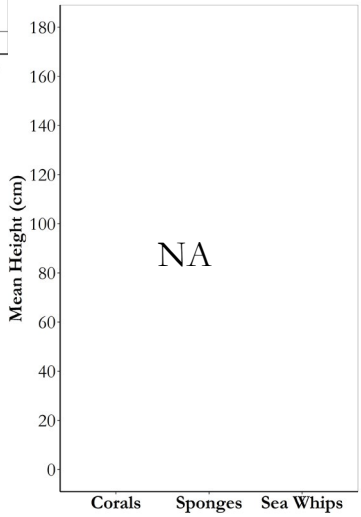
Summary - description of transect

Transect 50: Primary and secondary substrates consisted entirely of sand and mud. Fish and crab density was 0.05 individuals/m^2, and 57% of the observations were eelpouts. Snailfishes were the next most abundant species. One coral (*Swiftia* sp.) and 1 damaged *Halipteris* sp. were identified.

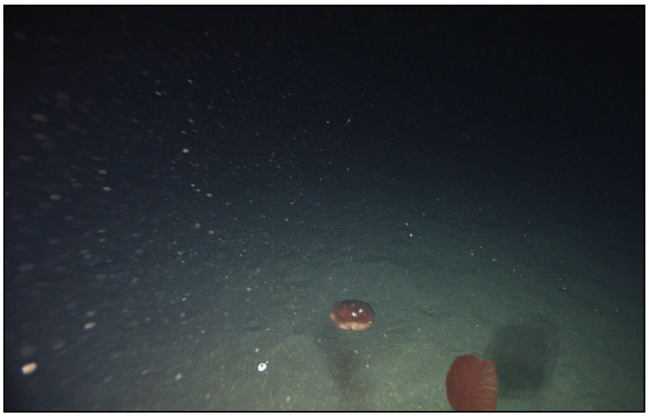
Area: Pribilof Canyon					Transect 51
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/15/14	56.20	-169.36	1,550	520	3.6

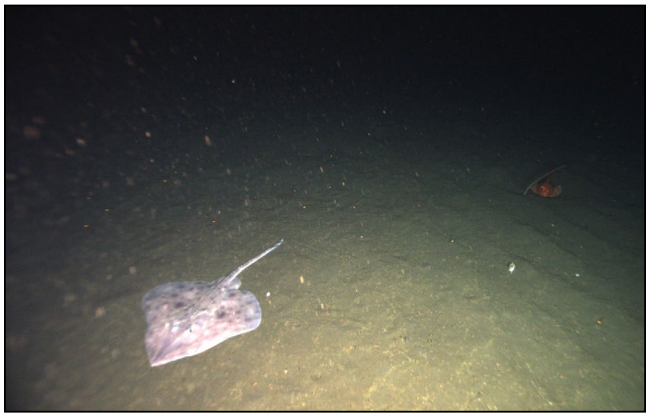






Images



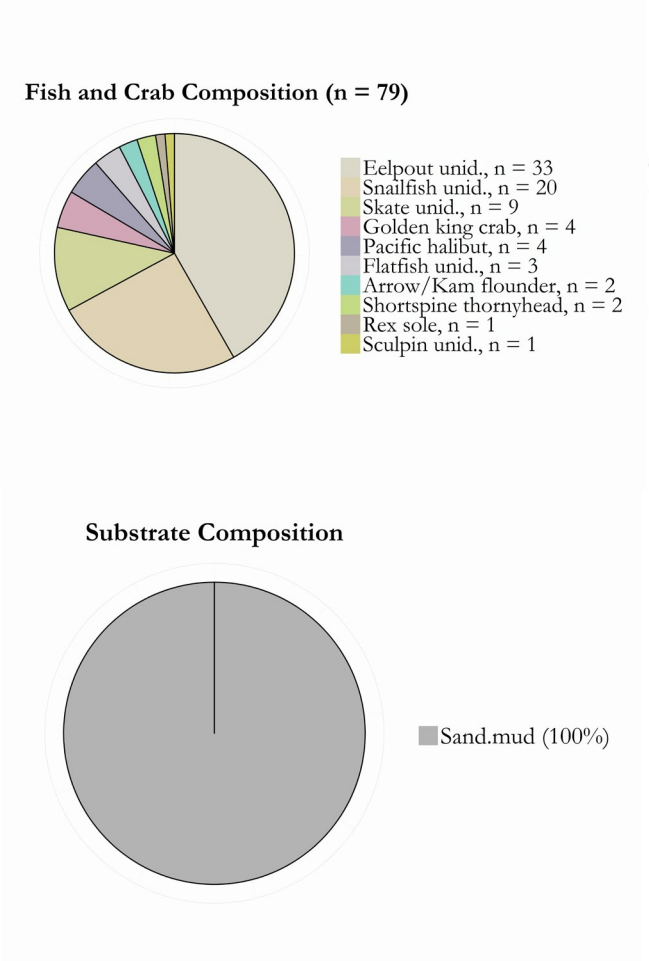


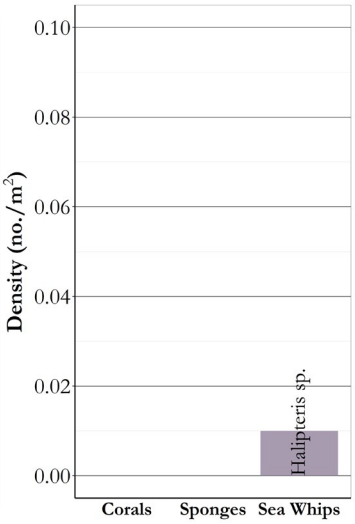
Summary - description of transect

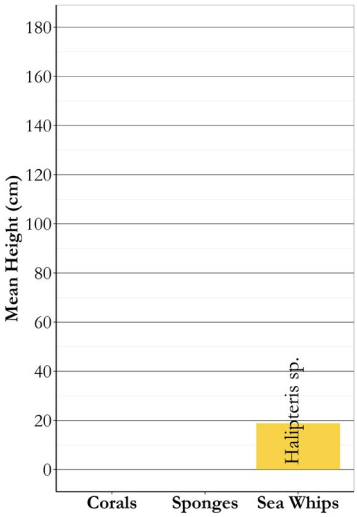
Transect 51: Primary and secondary substrates consisted entirely of sand and mud. Eighty-five individuals were identified, and 47% of them were eelpouts. Snailfishes accounted for another 28% of the total observations. Crab and fish density was 0.05 individuals/m^2. Two sea whips were counted. No other corals or sponges were identified.

Area: Pribilof Canyon — Transect 52

Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/16/14	56.21	-169.38	1,473	498	3.6





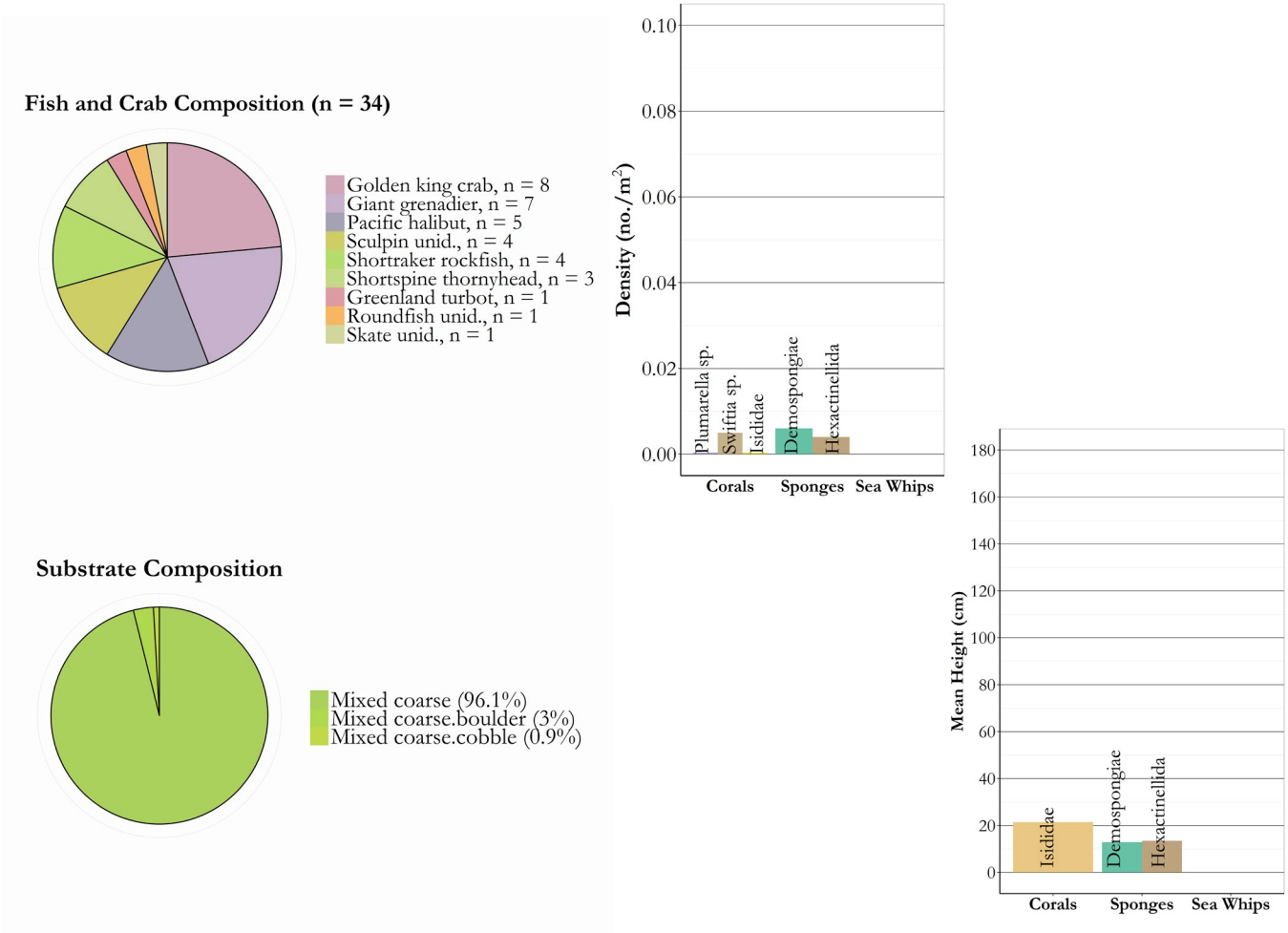


Images

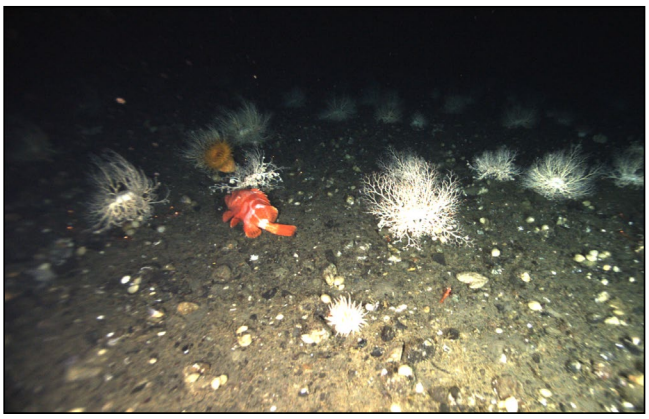
Summary - description of transect

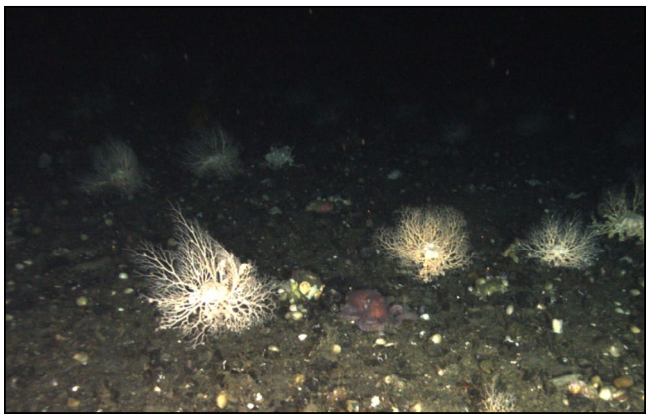
Transect 52: Primary and secondary substrates consisted entirely of sand and mud. Seventy-nine individuals were identified, 42% were eelpouts, and 25% were snailfishes. Fish and crab density was 0.05 individuals/m^2. Fourteen sea whips were counted. No other coral or sponge were identified.

Area: Pribilof Canyon					Transect 53
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/16/14	56.22	-169.38	3,016	446	3.7



Images



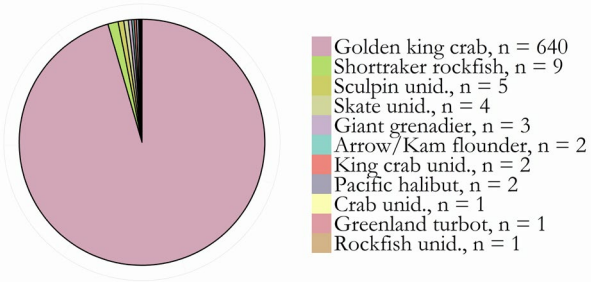


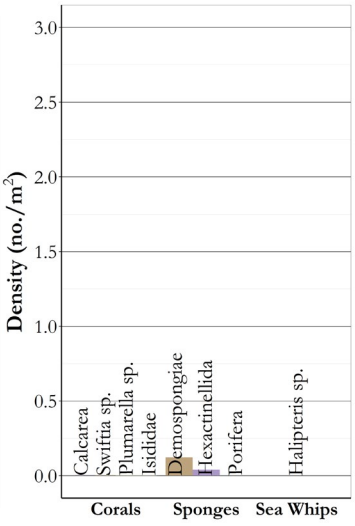
Summary - description of transect

Transect 53: Primary and secondary substrates consisted almost entirely of mixed coarse(96%). Overall fish and crab density was 0.01 individuals/m^2. Golden king crab (24%) and giant grenadier (21%) accounted for over 50% of the observed fish and crab taxa. The next most abundant taxa were Pacific halibut (15%), sculpins (12%), and shortraker rockfish (13%). Vertical habitat consisted of 1 Isididae, 1 *Plumarella* sp., 15 *Swiftia* sp, 19 Demospongiae, and 13 Hexactinellida, with a density of 0.02 individuals/m^2. Demospongiae heights ($n = 7$) ranged from 10.1 cm to 16.7 cm with a mean of 12.9 cm. Hexactinellida heights ($n = 4$) ranged from 11.0 cm to 19.2 cm with a mean of 13.5 cm. No sea whips were observed.

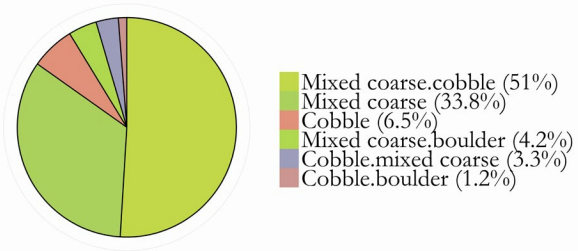
Area: Pribilof Canyon					Transect 54
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/16/14	56.23	-169.43	3,371	435	3.7

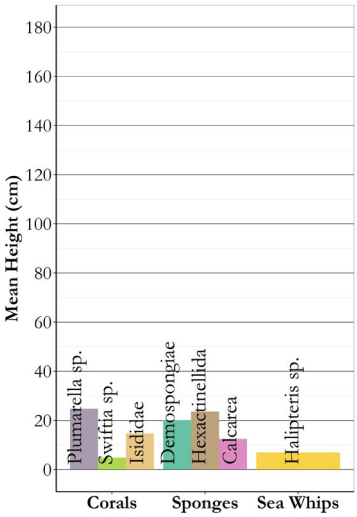
Fish and Crab Composition (n = 670)



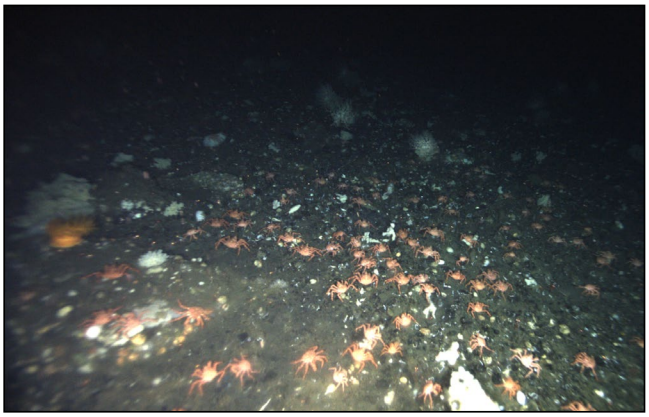


Substrate Composition





Images

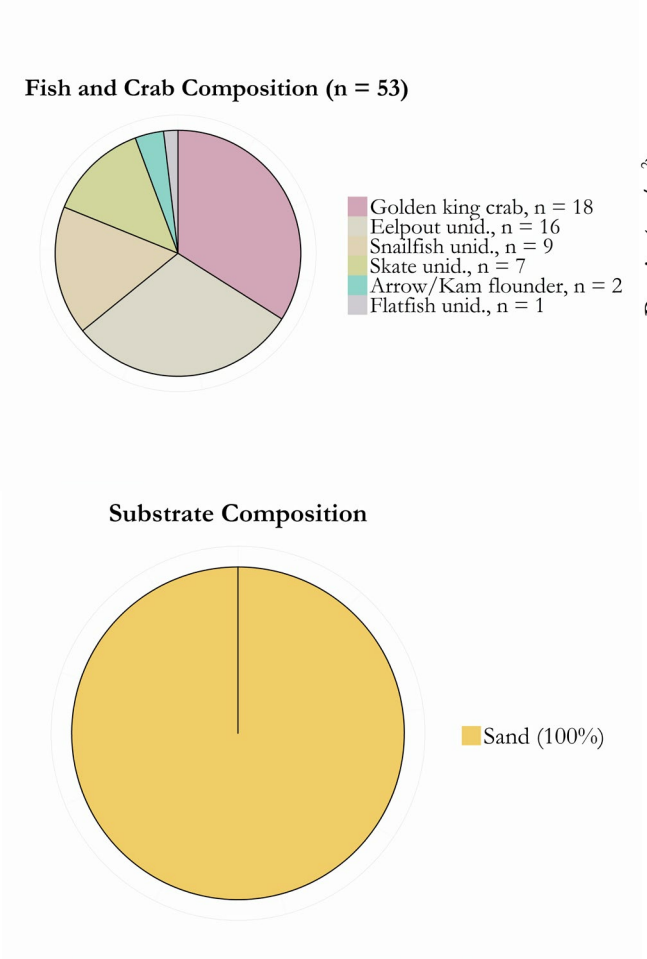


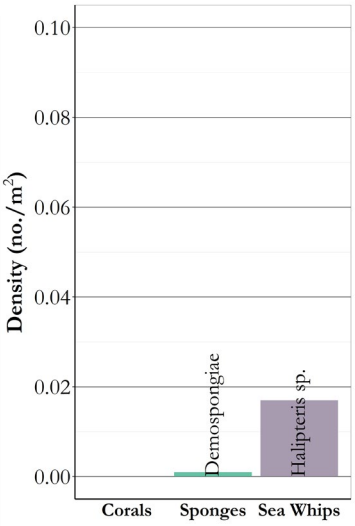
Summary - description of transect

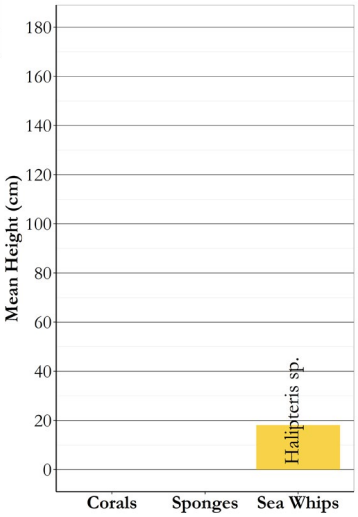
Transect 54: Primary and secondary substrates consisted mostly of mixed coarse and mixed coarse/cobble (85%). The remaining substrates were cobble and boulder with mixed coarse. Overall fish and crab density was 0.20 individuals/m^2. Of the 11 taxa identified, golden king crabs ($n = 640$) dominated the species composition (96%). Most of the crabs observed were juveniles. Vertical habitat consisted of 24 corals, and 565 sponges, with a density of 0.18 individuals/m^2. Demospongiae heights ($n = 128$) ranged from 10.0 cm to 61.6 cm with a mean of 20.1 cm. Hexactinellida heights ($n = 55$) ranged from 10.1 cm to 58.6 cm with a mean of 23.6 cm.

Area: Pribilof Canyon — Transect 55

Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/16/14	56.21	-169.44	1,620	502	3.6





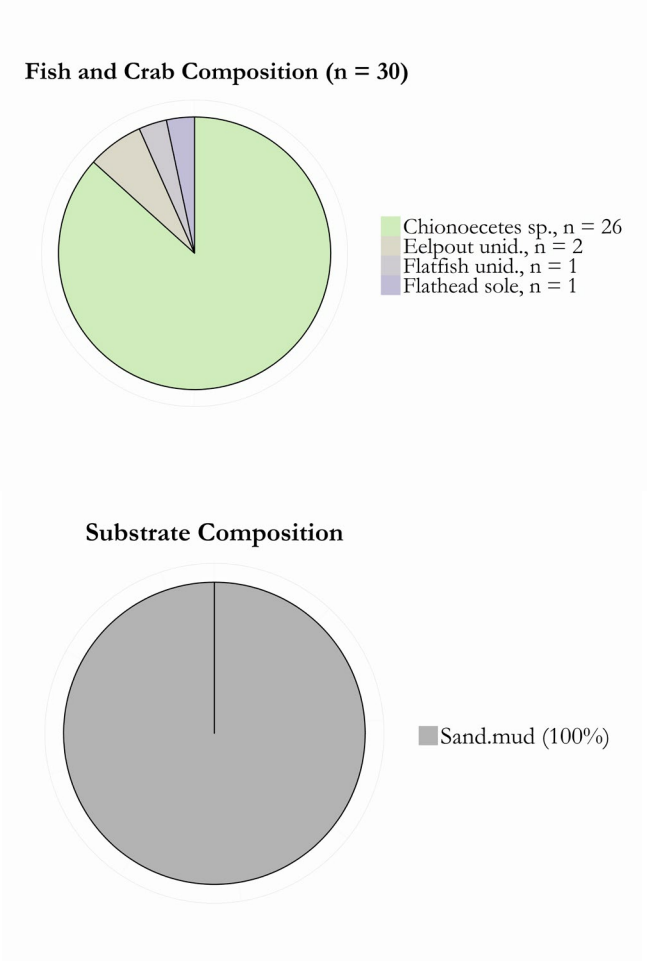


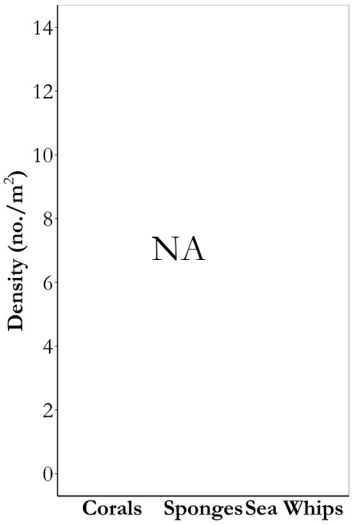
Images

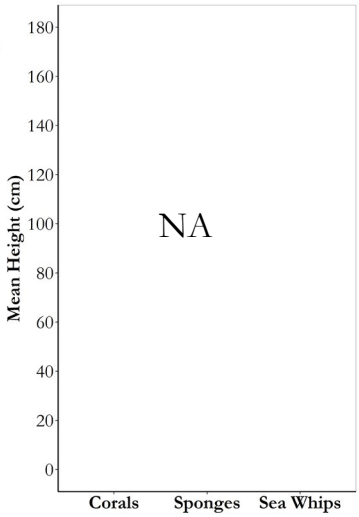
Summary - description of transect

Transect 55: Primary and secondary substrates consisted entirely of sand. Overall fish and crab density was 0.03 individuals/m^2. Golden king crab (34%) and eelpouts (31%) accounted for over 60% of the enumerated taxa. The next most abundant taxa were snailfishes (17%). Vertical habitat consisted of 28 sea whips and 1 Demospongiae, with a density of 0.02 individuals/m^2. Sea whip heights ($n = 19$) ranged from 4.5 cm to 31.7 cm with a mean of 18.1 cm. No other corals were observed.

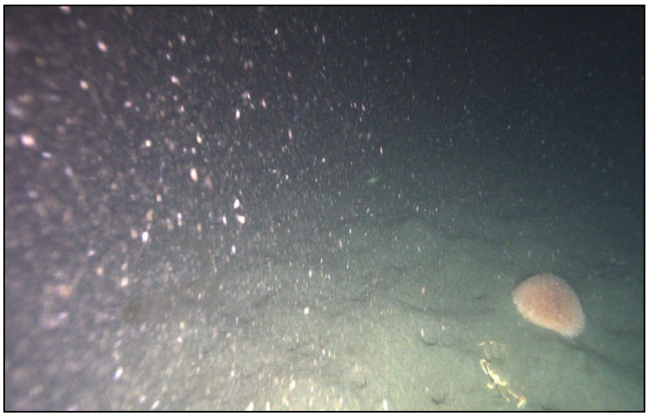
Area: Pribilof Canyon					Transect 58
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/16/14	56.42	-169.84	980	93	4.5

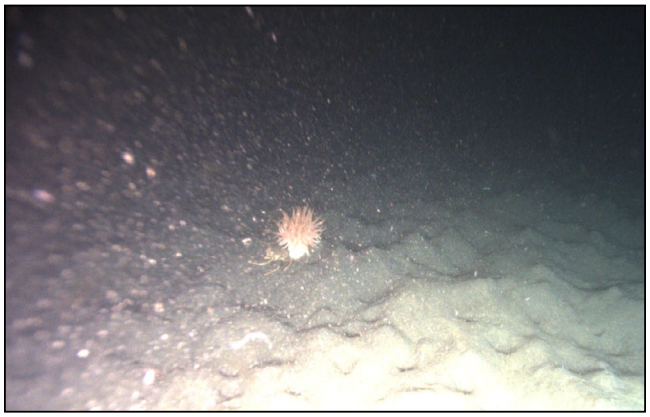






Images



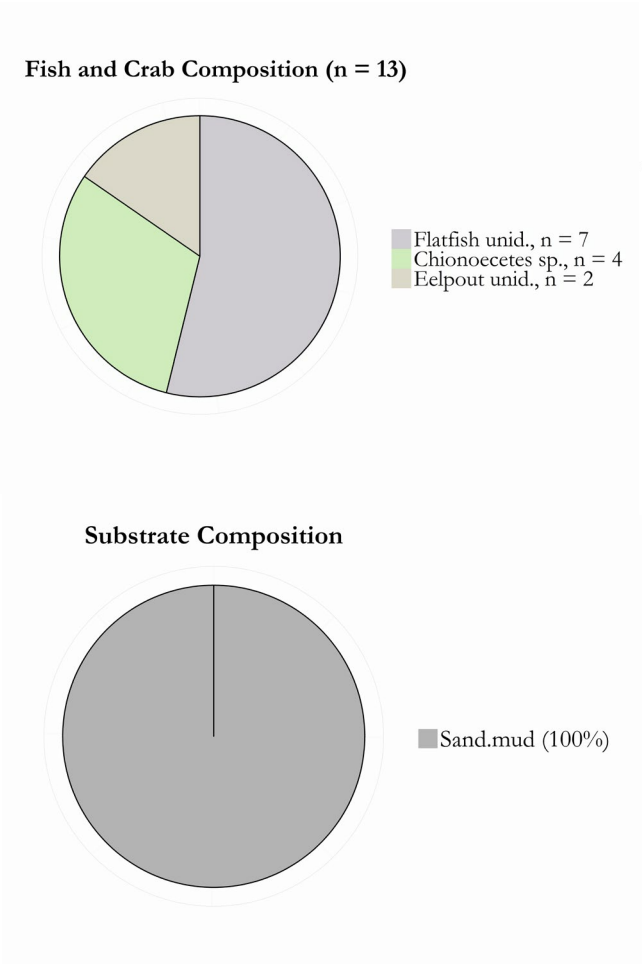


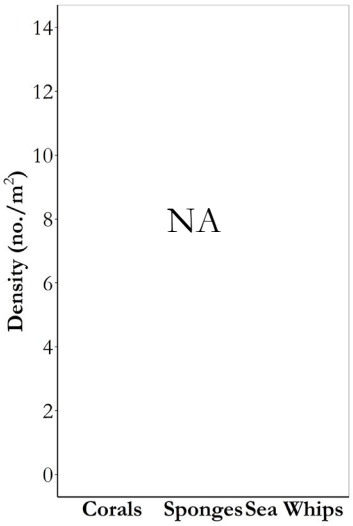
Summary - description of transect

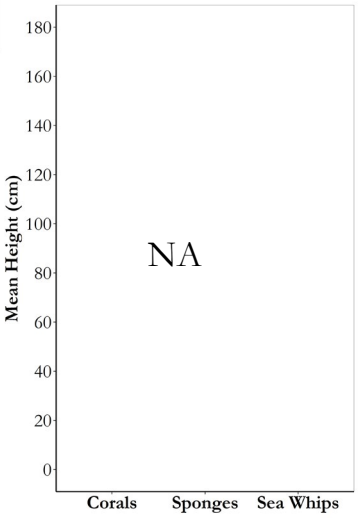
Transect 58: Primary and secondary substrates consisted of sand and mud. Overall fish and crab density was 0.03 individuals/m^2. *Chionoecetes* sp. ($n = 26$) dominated the species composition accounting for 87% of the enumerated taxa. No vertical habitat was identified.

Area: Pribilof Canyon — Transect 59

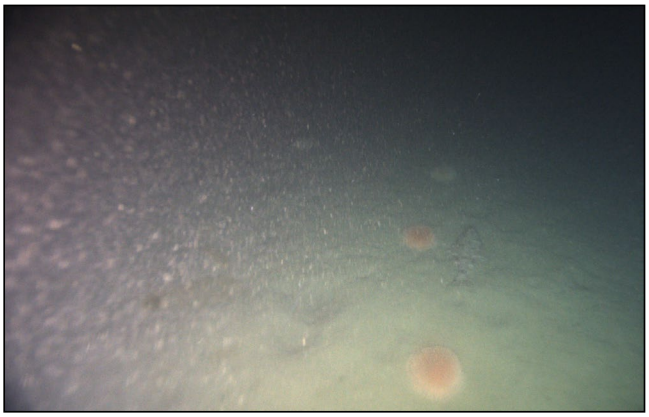
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/16/14	56.35	-169.97	534	105	4.5







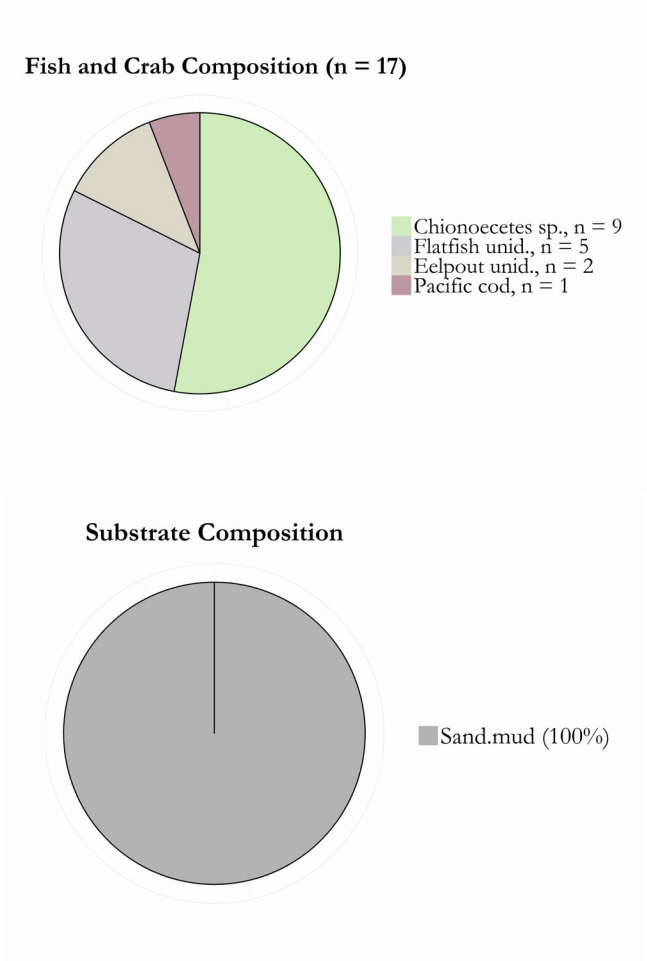
Images

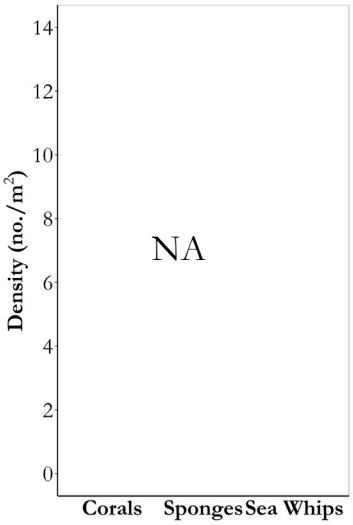


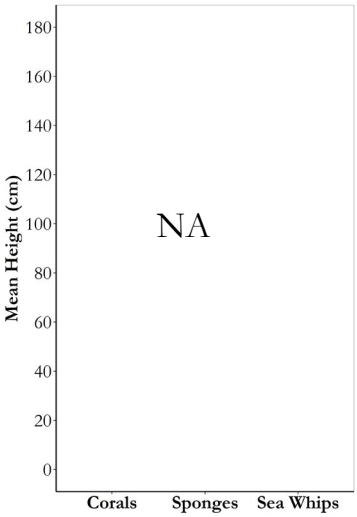
Summary - description of transect

Transect 59: Primary and secondary substrates consisted of sand and mud. Only 11 individuals from 3 taxa were identified. Overall fish and crab density was 0.02 individuals/m^2. No vertical habitat was identified.

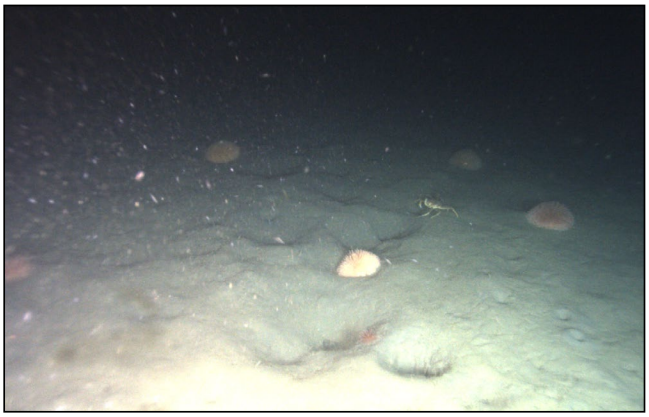
Area: Pribilof Canyon					Transect 60
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/16/14	56.36	-169.86	833	105	4.5

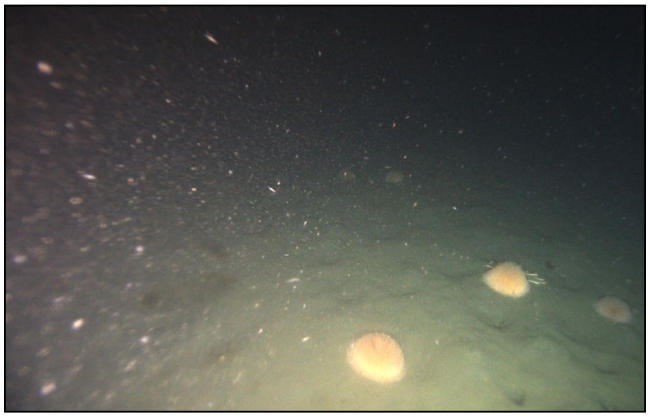






Images



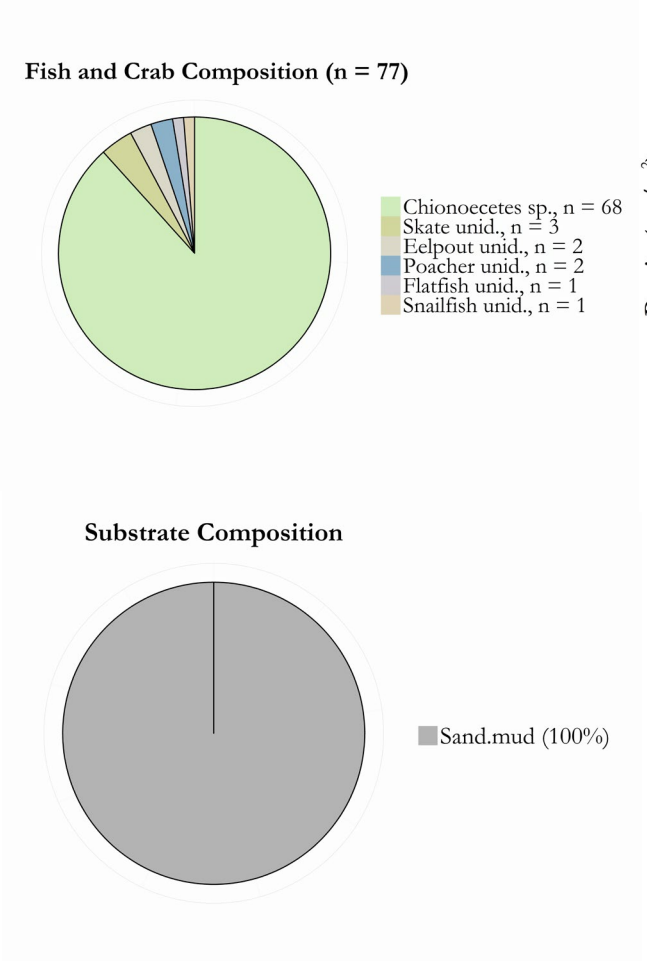


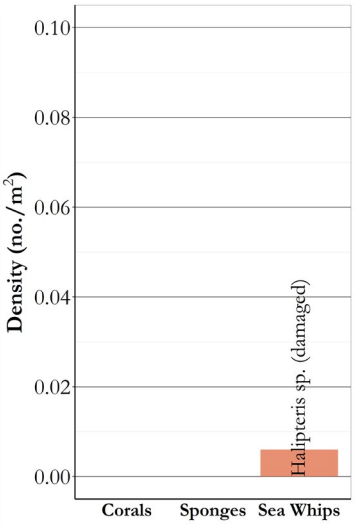
Summary - description of transect

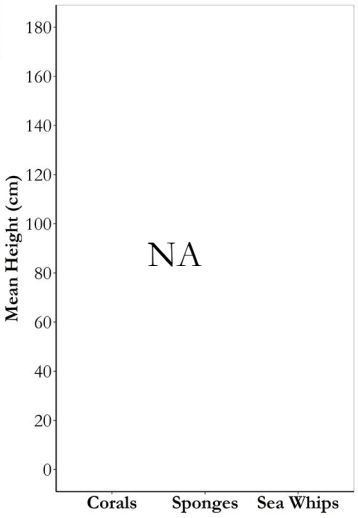
Transect 60: Primary and secondary substrates consisted entirely of sand and mud. Only 17 individuals from four taxa were identified. Overall fish and crab density was 0.02 individuals/m^2. The most abundant taxa were *Chionoecetes* sp. (53%). No vertical habitat was identified.

Area: Pribilof Canyon — Transect 61

Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/16/14	56.36	-169.76	1,611	115	4.5







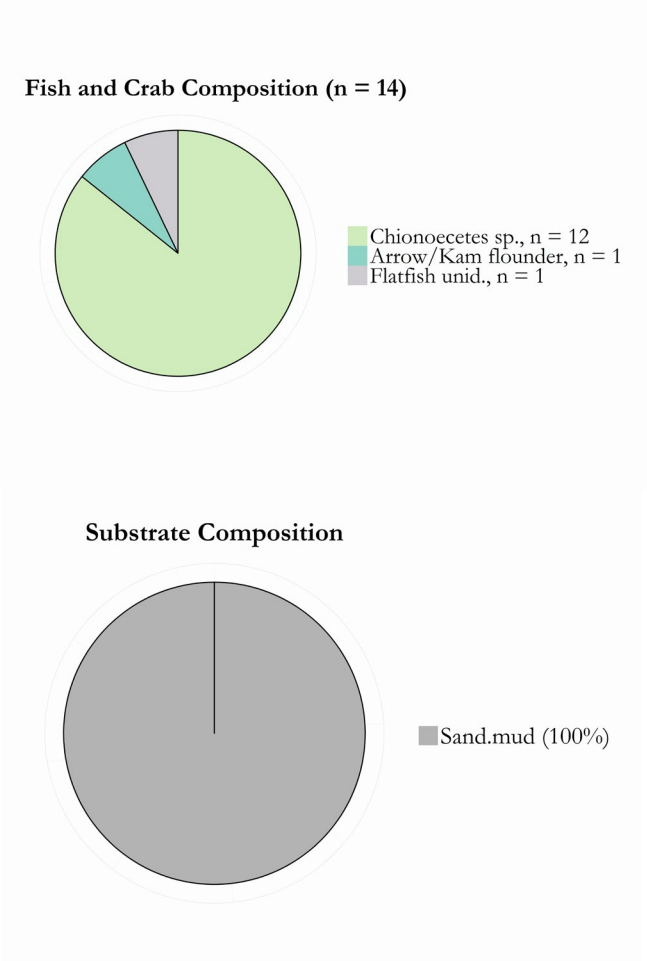
Images

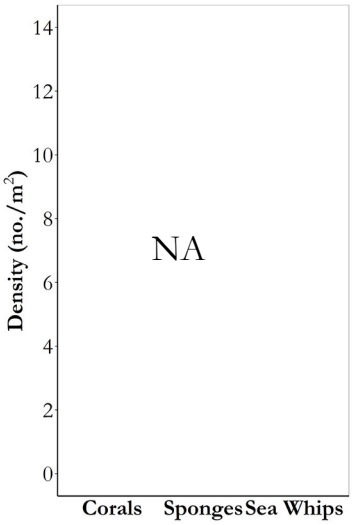
Summary - description of transect

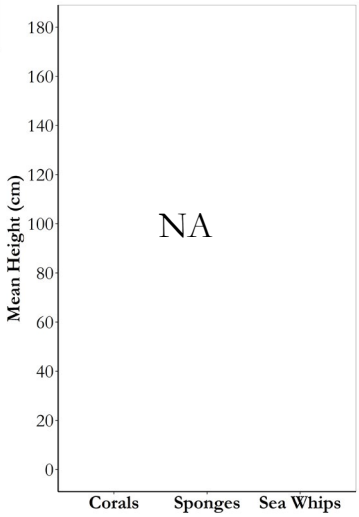
Station 61: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.05 individuals/m^2. The most abundant taxa were *Chionoecetes* sp. (88%). Nine *Halipteris* sp.(damaged) were identified.

Area: Pribilof Canyon — Transect 62

Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/16/14	56.31	-169.79	1,679	126	4.4







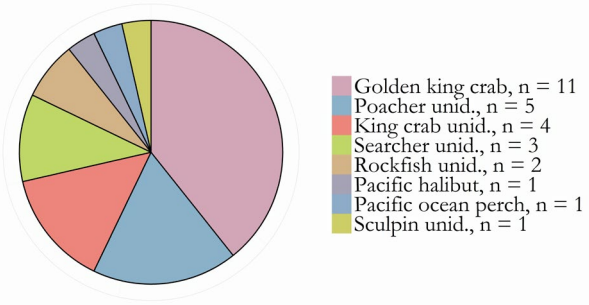
Images

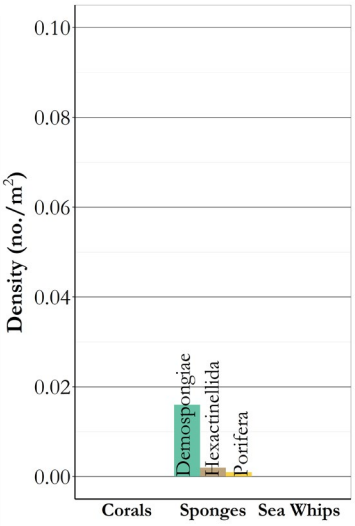
Summary - description of transect

Transect 62: Primary and secondary substrates consisted of sand and mud. Only 14 individuals from three taxa were identified. Overall fish and crab density was 0.01 individuals/m^2. *Chionoecetes* sp. ($n = 12$) dominated the species composition accounting for 86% of the enumerated taxa. No vertical habitat was identified.

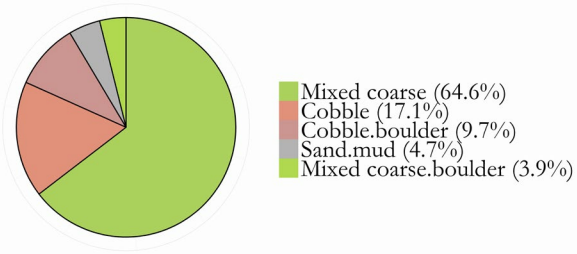
Area: Pribilof Canyon					Transect 63
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/16/14	56.31	-169.70	1,110	188	4.0

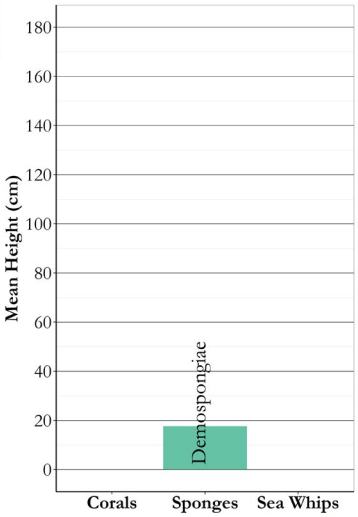
Fish and Crab Composition (n = 28)





Substrate Composition





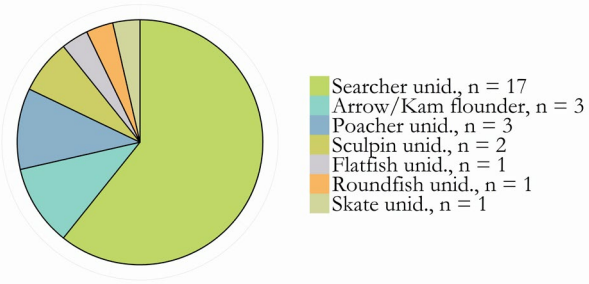
Images

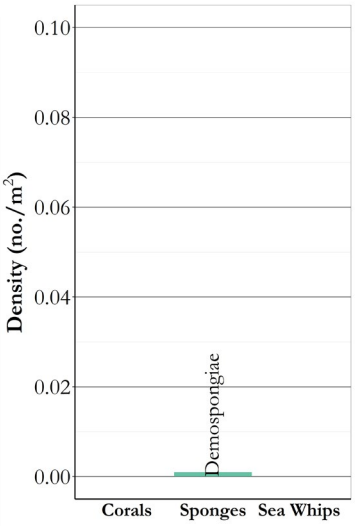
Summary - description of transect

Transect 63: Primary and secondary substrates consisted of mixed coarse, cobble, and boulder (47%). The remaining 53% of the frames were off bottom with no visual input received. Overall fish and crab density was 0.03 individuals/m^2. Vertical habitat consisted of 21 sponges, with a density of 0.02 individuals/m^2. Demospongiae heights ($n = 5$) ranged from 10.2 cm to 24.8 cm with a mean of 17.7 cm. No other corals or sponges were observed.

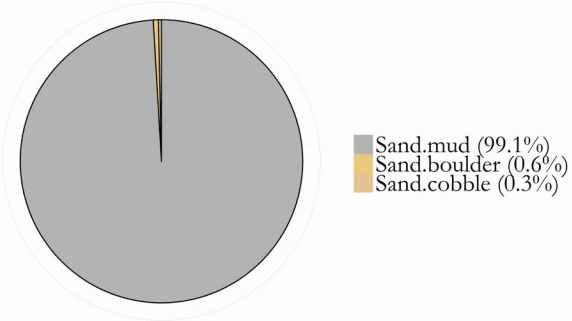
Area: Pribilof Canyon					Transect 65
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/16/14	56.30	-169.45	2,080	181	4.2

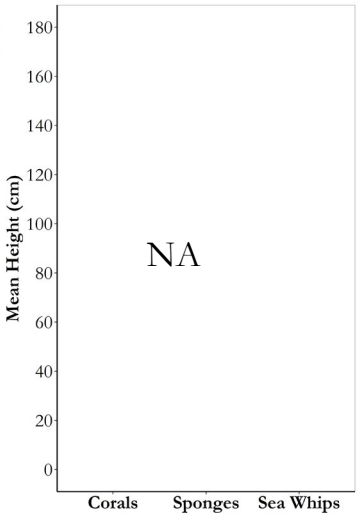
Fish and Crab Composition (n = 28)





Substrate Composition





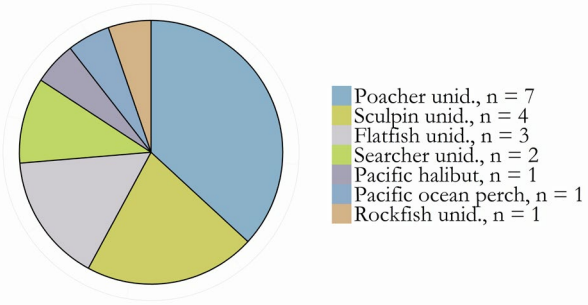
Images

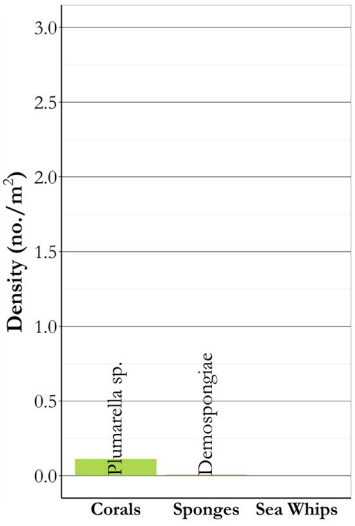
Summary - description of transect

Transect 65: Primary and secondary substrates consisted almost entirely of sand and mud. Overall fish and crab density was 0.01 individuals/m^2. Searchers accounted for 61% of the enumerated taxa. Vertical habitat consisted of 2 Demospongiae, with a density of < 0.01 individuals/m^2. No corals were observed.

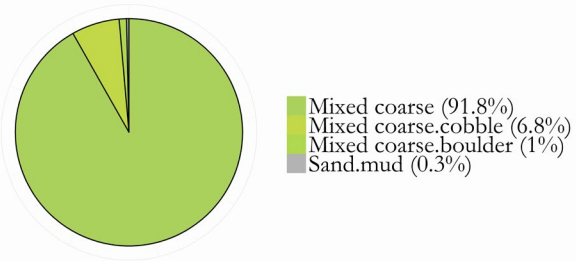
Area: Pribilof Canyon					Transect 66
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/17/14	56.28	-169.60	1,559	201	4.2

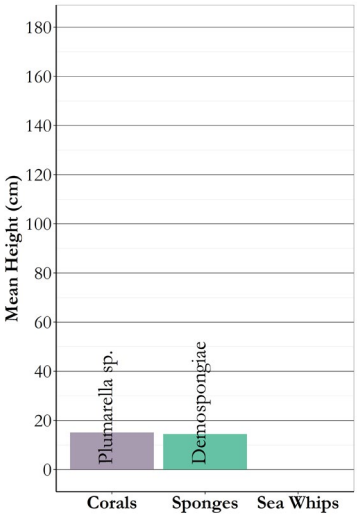
Fish and Crab Composition (n = 19)





Substrate Composition





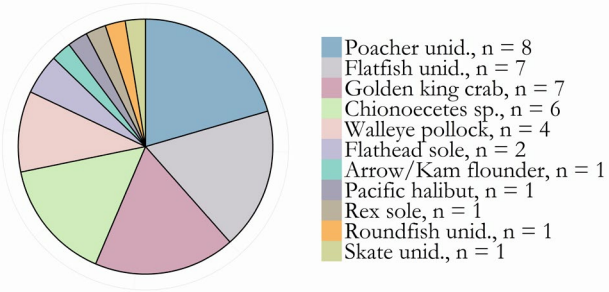
Images

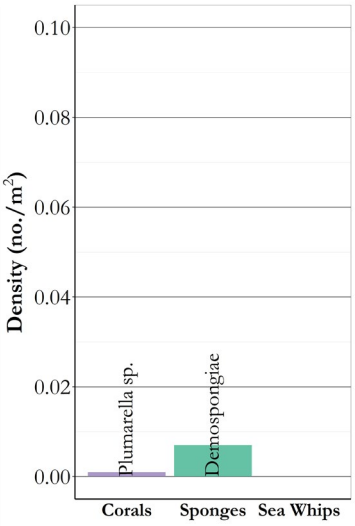
Summary - description of transect

Transect 66: Primary and secondary substrates consisted almost entirely of mixed coarse. Overall fish and crab density was 0.01 individuals/m^2. Poachers accounted for 37% of the enumerated taxa. Vertical habitat consisted of 174 *Plumarella* sp. and 11 Demospongiae, with a density of 0.12 individuals/m^2. *Plumarella* sp. heights ($n = 58$) ranged from 5.7 cm to 52.7 cm with a mean of 15.1 cm. Demospongiae heights ($n = 4$) ranged from 10.5 cm to 17.6 cm with a mean of 14.4 cm. No sea whips were observed.

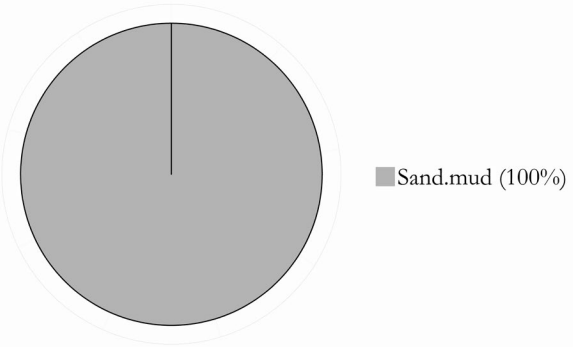
Area: Pribilof Canyon					Transect 67
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/17/14	56.26	-169.72	2,243	261	3.9

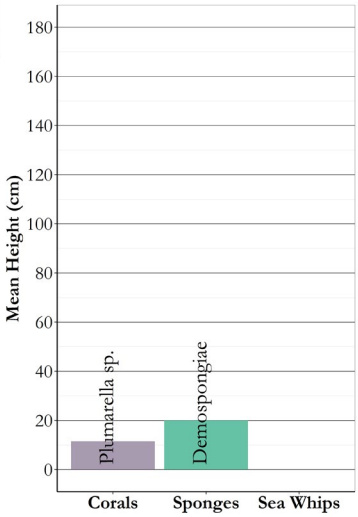
Fish and Crab Composition (n = 39)



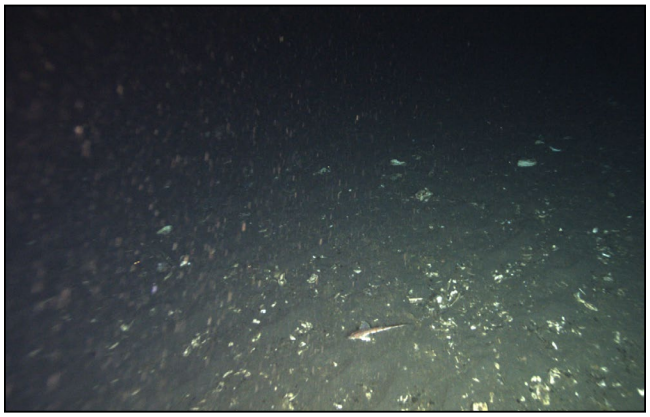


Substrate Composition





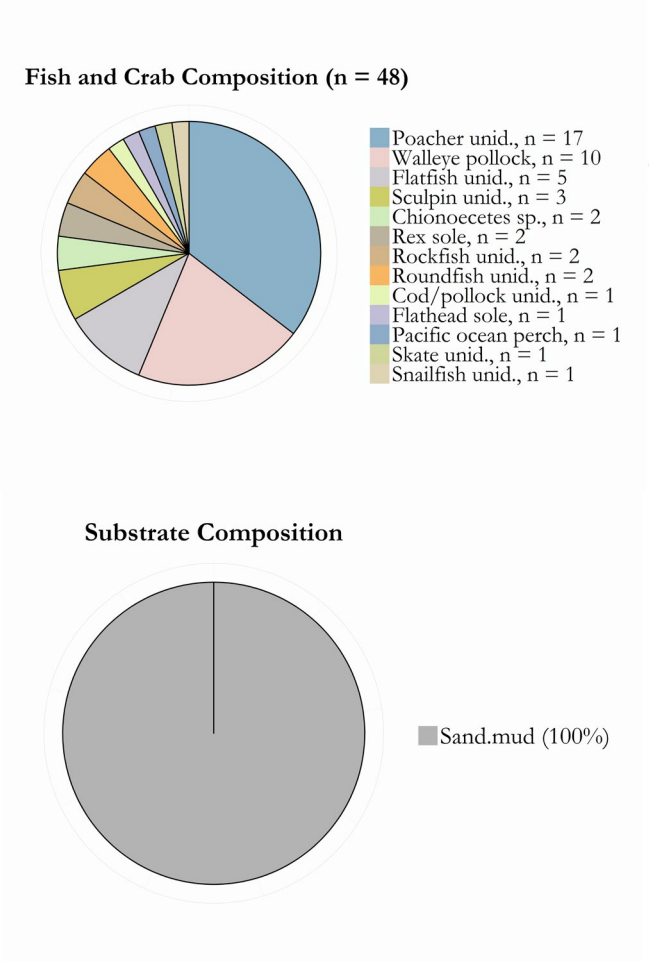
Images

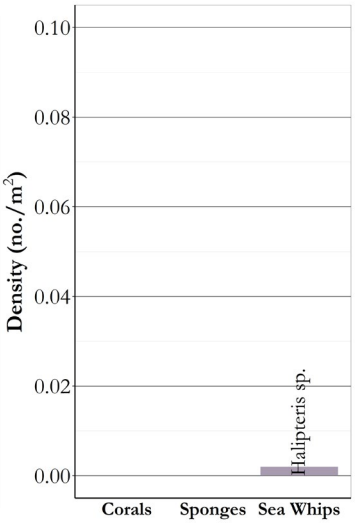


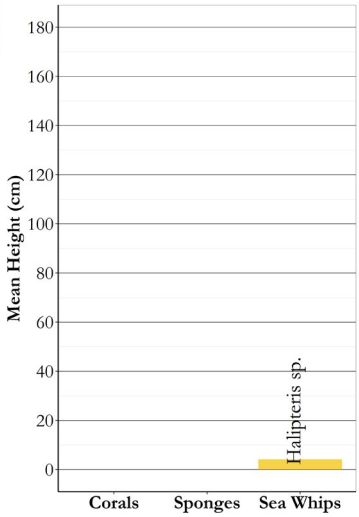
Summary - description of transect

Transect 67: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.02 individuals/m^2. Crabs, flatfishes, and poachers accounted for 72% of the enumerated taxa. Vertical habitat consisted of 16 Demospongiae and 2 *Plumarella* sp., with a density of 0.01 individuals/m^2. Demospongiae heights ($n = 6$) ranged from 12.2 cm to 29.4 cm with a mean of 20.0 cm. No sea whips were observed.

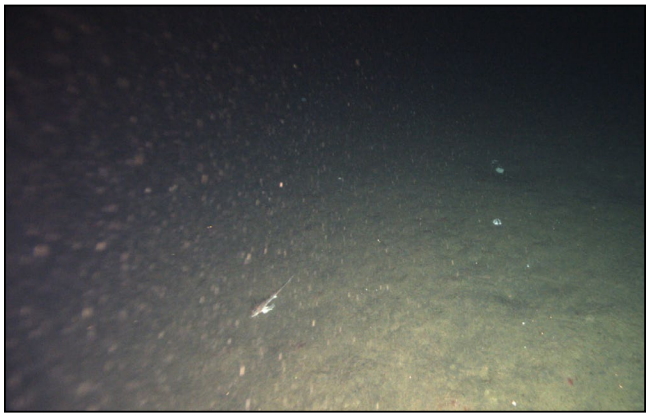
Area: Pribilof Canyon					Transect 68
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/17/14	56.22	-169.75	2,328	261	4.1







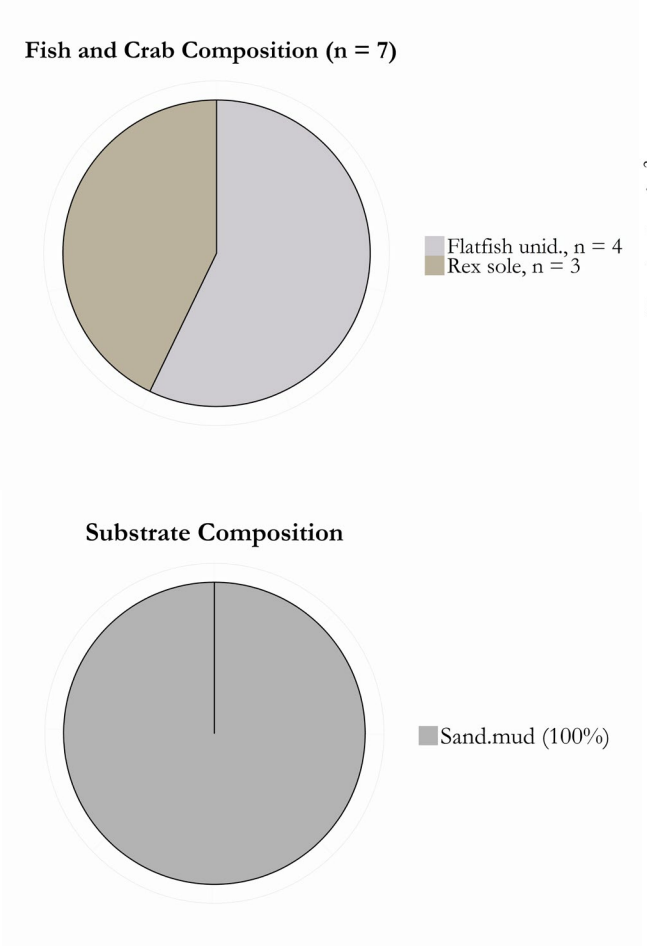
Images

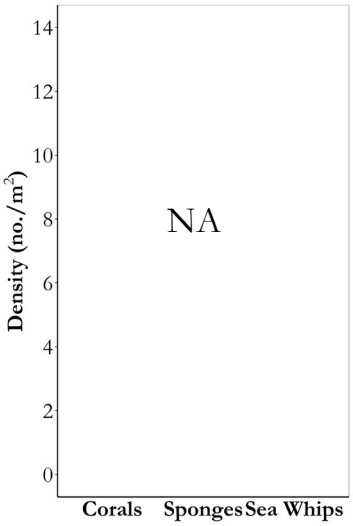


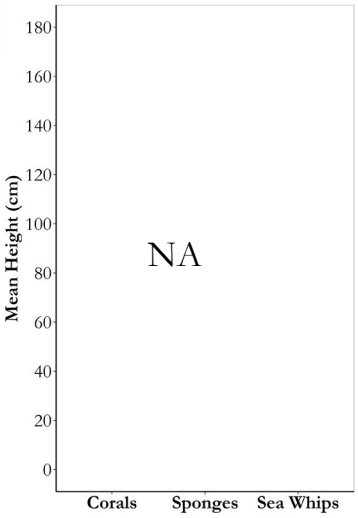
Summary - description of transect

Transect 68: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.02 individuals/m^2. Species composition was more diverse than surrounding transects, 48 individuals were identified in 13 taxa. Poachers accounted for 35% of the enumerated taxa. The next most abundant taxa were walleye pollock (21%). Vertical habitat consisted of 4 sea whips, with a density of < 0.01 individuals/m^2. Sea whip heights ($n = 2$) ranged from 4.1 cm to 4.2 cm with a mean of 4.1 cm. No corals or sponges were observed.

Area: Pribilof Canyon					Transect 69
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/17/14	56.17	-169.69	445	314	3.8





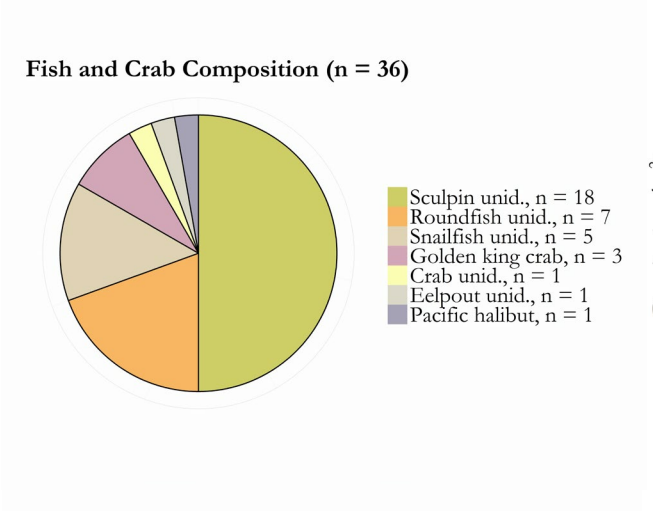


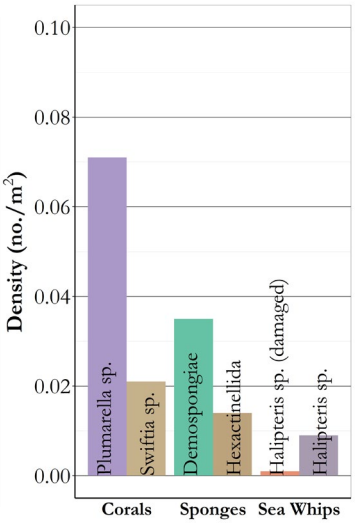
Images

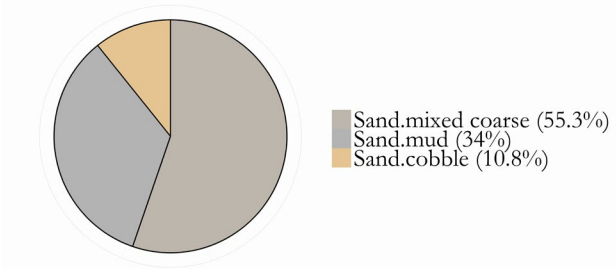
Summary - description of transect

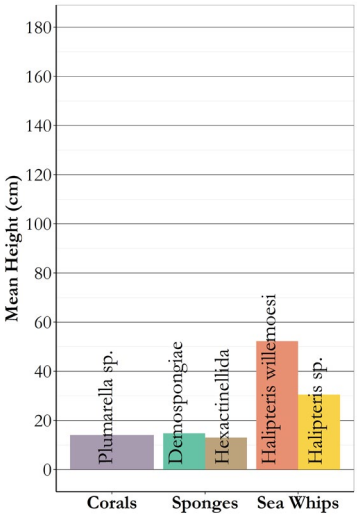
Transect 69: This transect was ~22% shorter than usual, only 199 frames of data were recorded. Primary and secondary substrates consisted entirely of sand and mud. Only 7 individuals from 2 taxa were identified. Overall fish and crab density was 0.02 individuals/m^2. Flatfishes comprised 100% of the taxa. No vertical habitat was identified.

Area: Pribilof Canyon					Transect 70
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/17/14	56.18	-169.58	1,105	399	3.7

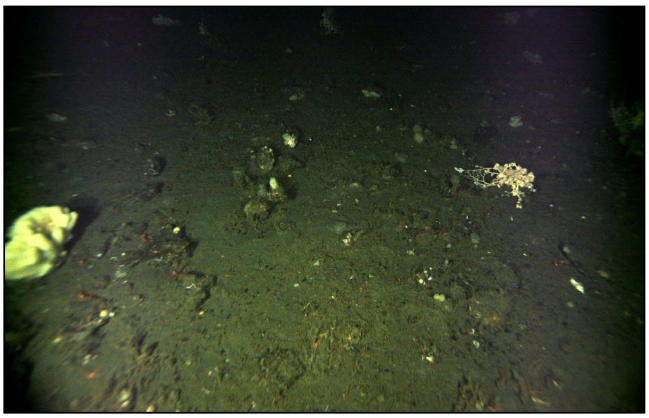








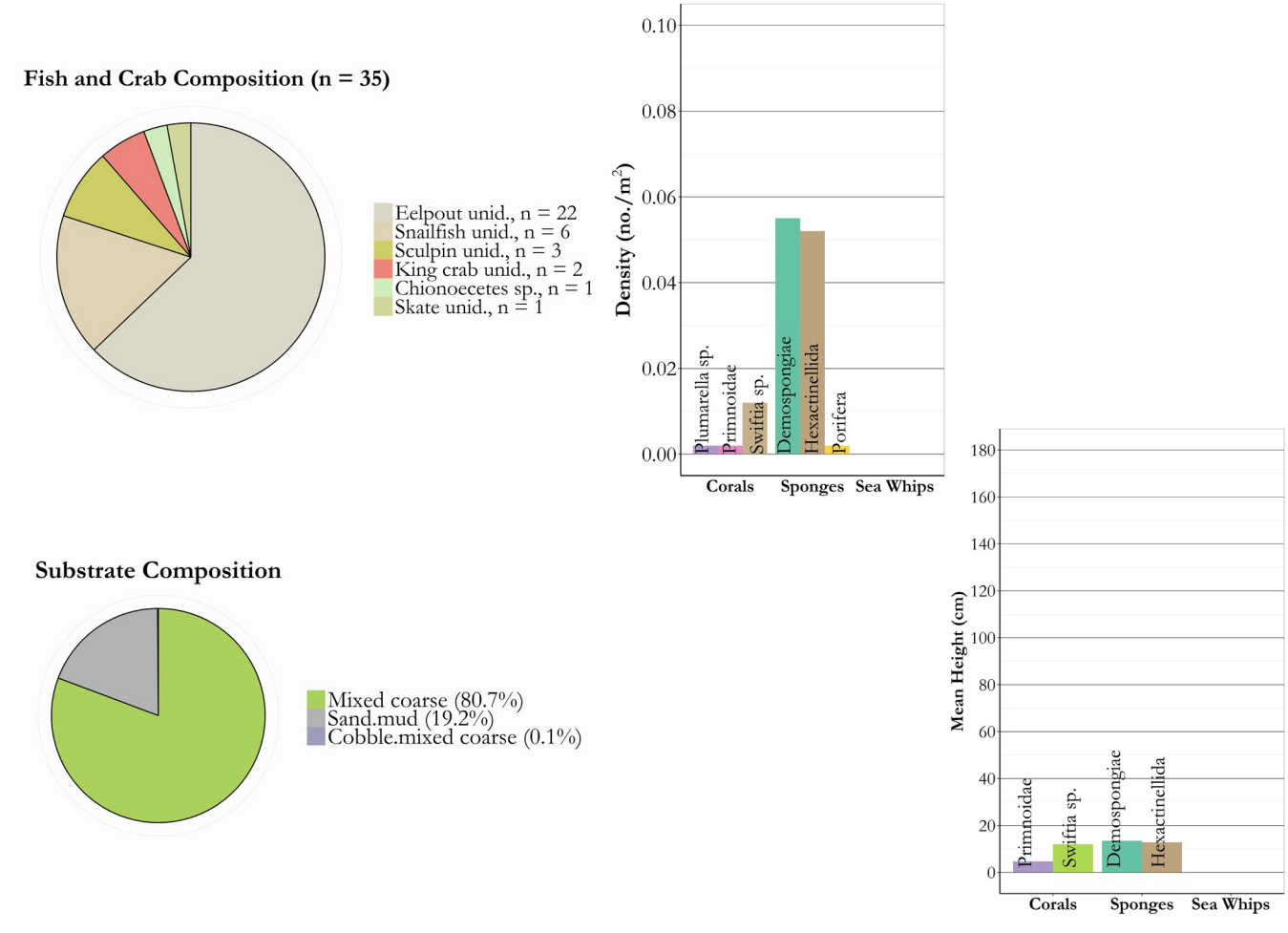
Images



Summary - description of transect

Transect 70: Primary and secondary substrates consisted of sand/cobble, sand/mixed coarse, and sand/mud. Overall fish and crab density was 0.03 individuals/m^2. Sculpins accounted for 50% of the enumerated taxa. Vertical habitat was diverse, consisting of *Plumarella* sp., *Swiftia* sp., *Halipteris* sp., Demospongiae, and Hexactinellida, with a density of 0.15 individuals/m^2. *Halipteris* sp. heights ($n = 5$) ranged from 7.5 cm to 54.0 cm with a mean of 30.5 cm. Demospongiae heights ($n = 11$) ranged from 11.1 cm to 27.9 cm with a mean of 14.7 cm. Hexactinellida heights ($n = 7$) ranged from 10.2 cm to 20.5 cm with a mean of 13.0 cm. *Plumarella* sp. heights ($n = 23$) ranged from 535 cm to 28.8 cm with a mean of 14.1 cm.

Area: Pribilof Canyon					Transect 71
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/17/14	56.15	-169.36	561	760	3.3

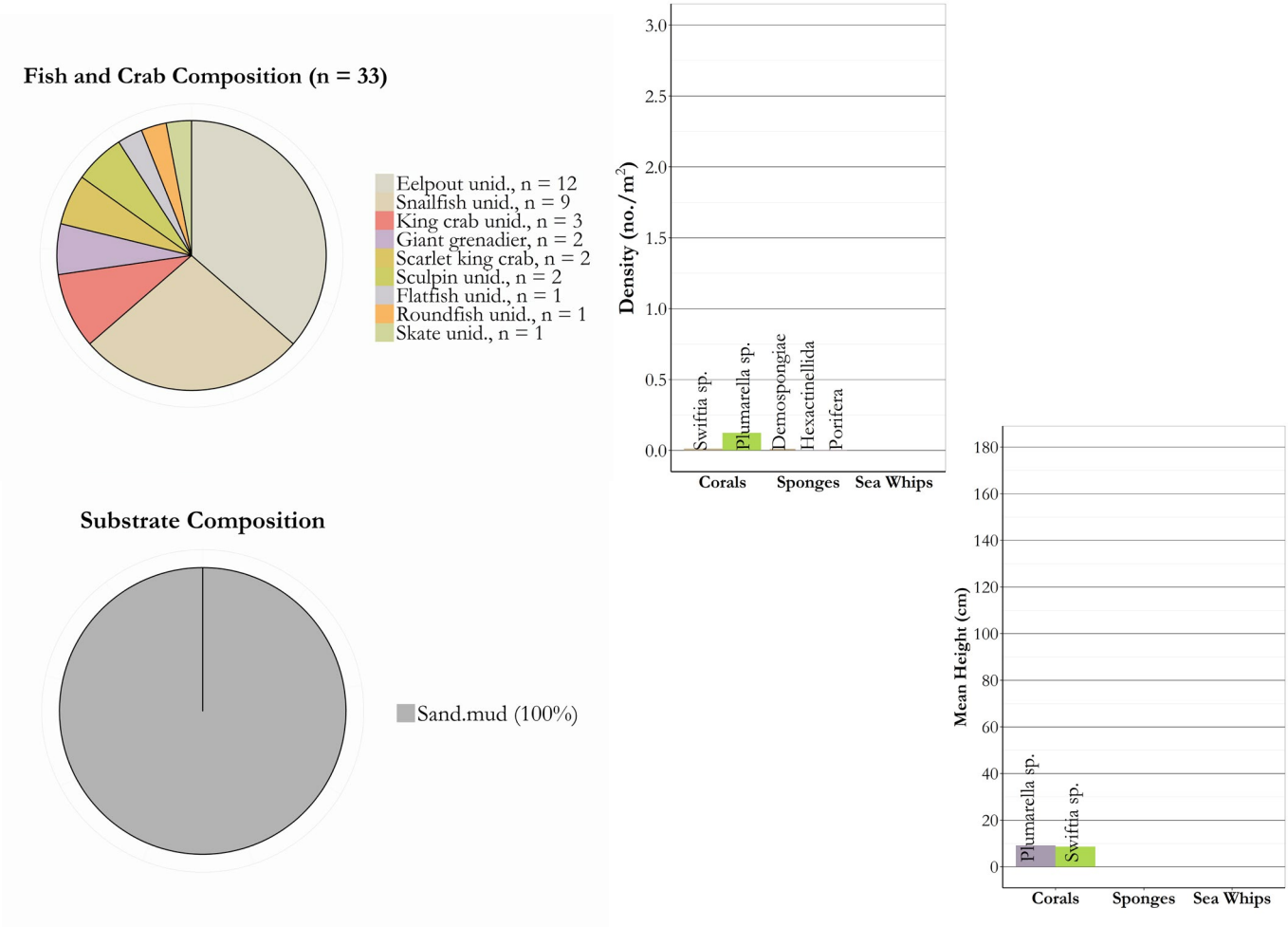


Images

Summary - description of transect

Transect 71: Primary and secondary substrates consisted of mixed coarse (81%) and sand/mud (19%). Overall fish and crab density was 0.01 individuals/m^2. Eelpouts accounted for 63% of the enumerated taxa. Vertical habitat was diverse, consisting of *Plumarella* sp., Primnoidae, *Swiftia* sp., Porifera, Demospongiae, and Hexactinellida, with a density of 0.13 individuals/m^2. Demospongiae heights ($n = 6$) ranged from 10.6 cm to 18.9 cm with a mean of 13.5 cm. Hexactinellida heights ($n = 2$) ranged from 12.6 cm to 13.0 cm with a mean of 12.8 cm. No sea whips were observed.

Area: Pribilof Canyon					Transect 72
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/17/14	56.15	-169.36	581	761	3.3



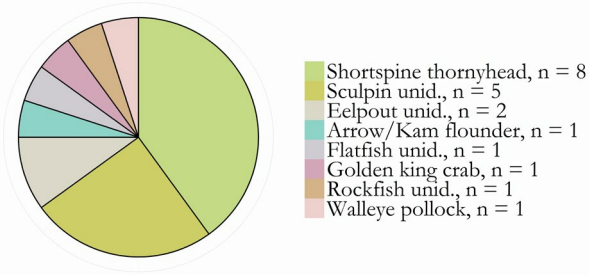
Images

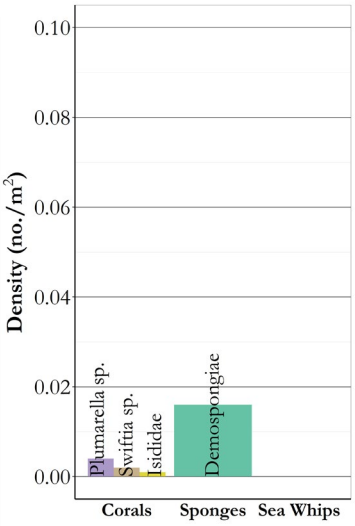
Summary - description of transect

Transect 72: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.06 individuals/m^2. Eelpouts and snailfishes accounted for 64% of the enumerated taxa. Vertical habitat was diverse, consisting of 114 coral and 8 sponge, with a density of 0.21 individuals/m^2. *Plumarella* sp. heights ($n = 15$) ranged from 3.8 cm to 22.2 cm with a mean of 9.2 cm. No sea whips were observed.

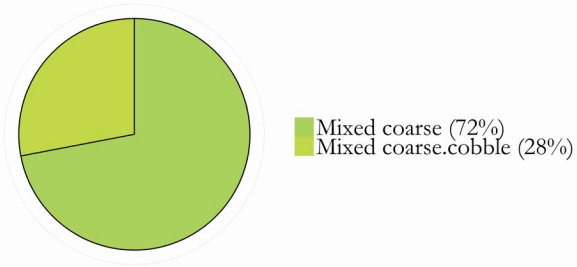
Area: Pribilof Canyon					Transect 73
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/17/14	56.09	-169.36	1,433	349	3.8

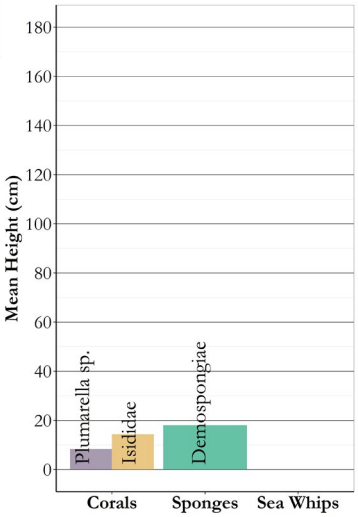
Fish and Crab Composition (n = 20)





Substrate Composition



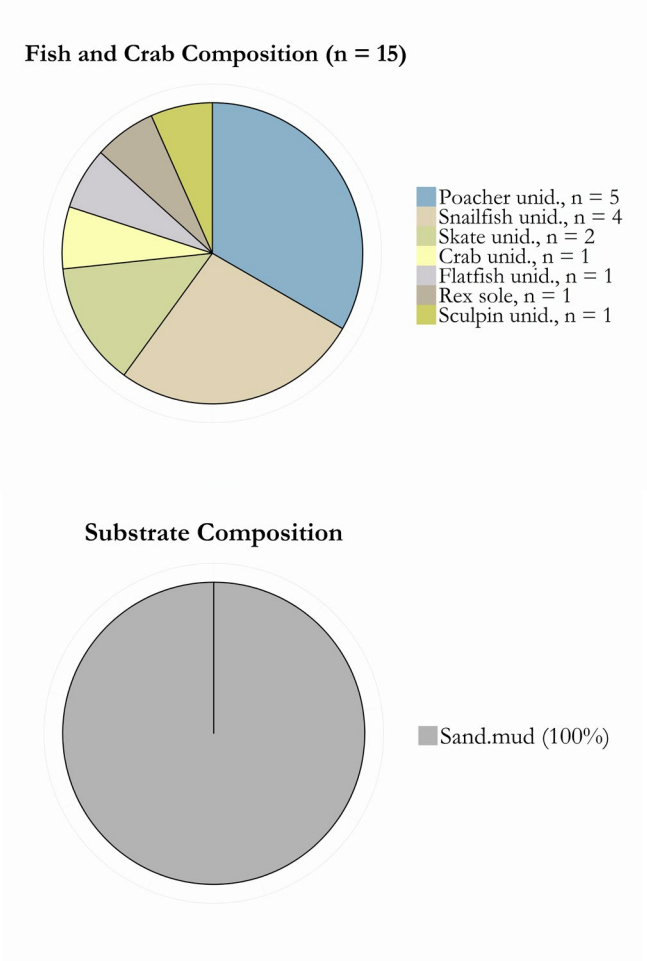


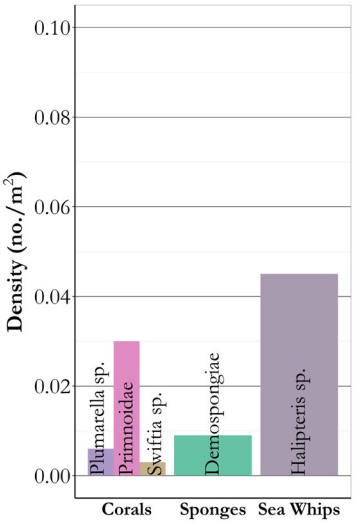
Images

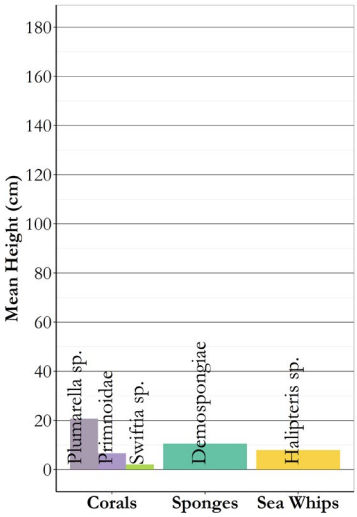
Summary - description of transect

Transect 73: Primary and secondary substrates consisted of mixed coarse and mixed coarse/cobble. Overall fish and crab density was 0.01 individuals/m^2. Shortspine thornyheads accounted for 45% of the enumerated taxa. The next most abundant taxa were sculpins (25%). Vertical habitat consisted of 5 coral taxa and Demospongiae, with a density of 0.02 individuals/m^2. Demospongiae heights (n =10) ranged from 10.4 cm to 36.1 cm with a mean of 18.0 cm. No sea whips were observed.

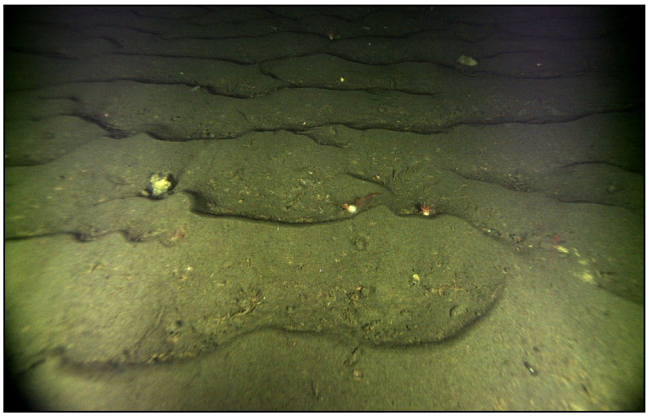
Area: Pribilof Canyon					Transect 74
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/17/14	56.07	-169.45	693	264	3.8

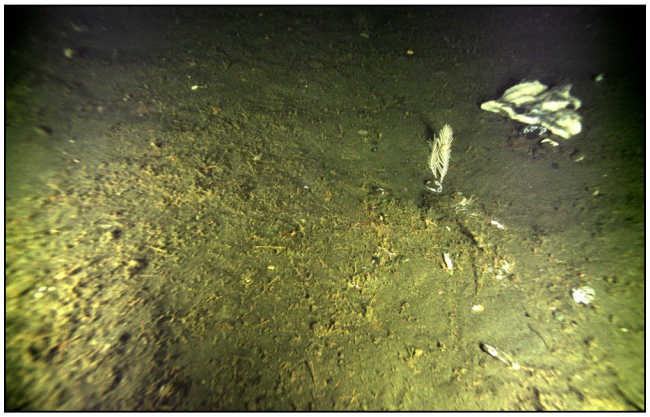






Images



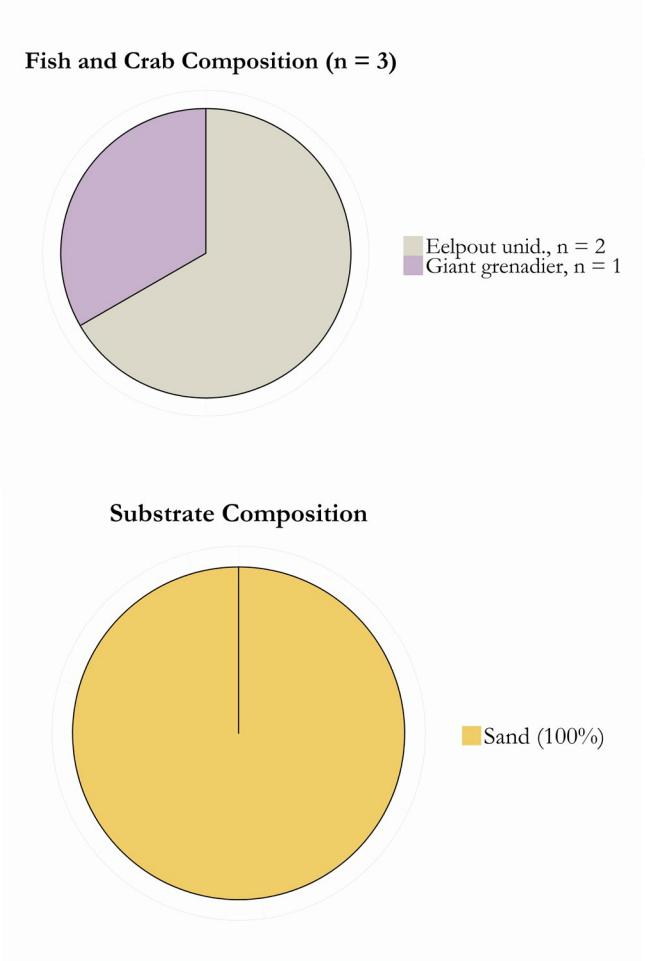


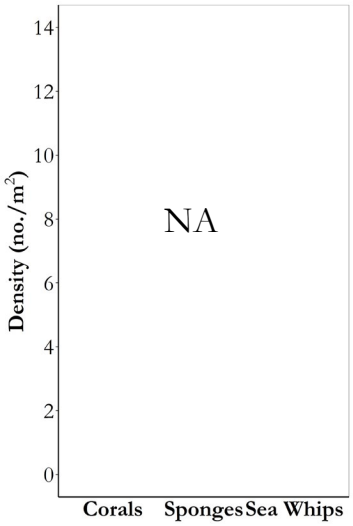
Summary - description of transect

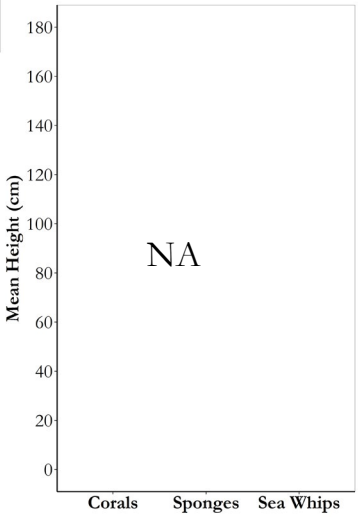
Transect 74: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.02 individuals/m^2. Poachers and snailfishes accounted for 60% of the enumerated taxa. Vertical habitat consisted of 3 coral taxa, 6 Demospongiae, and 31 sea whips, with a density of 0.01 individuals/m^2. *Halipteris* sp. heights ($n = 14$) ranged from 2.9 cm to 21.4 cm with a mean of 8.0 cm. Primnoidae heights ($n = 10$) ranged from 3.8 cm to 9.5 cm with a mean of 6.6 cm.

Area: Pribilof Canyon — Transect 226

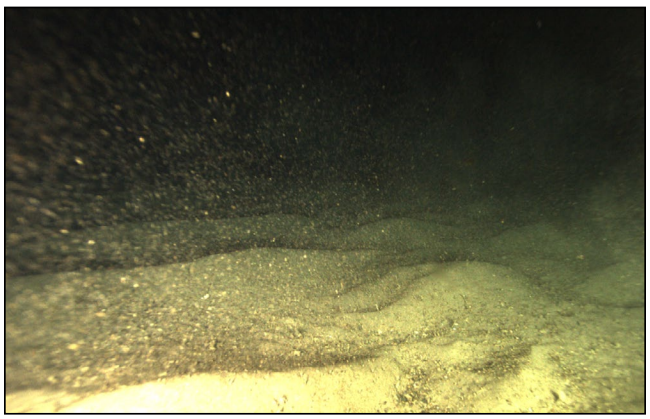
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/2/14	56.09	-168.82	373	717	3.3

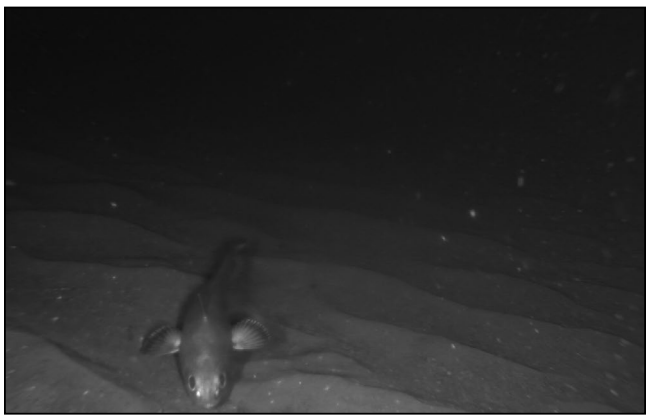






Images





Summary - description of transect

Transect 226: Primary and secondary substrates consisted entirely of sand (63%). The remaining 37% of the frames were off bottom with no visual input received. Overall fish and crab density was very low, 0.01 individuals/m^2. Only 3 individuals in 2 taxa were identified. No vertical habitat was observed.

Sixty-eight transects were completed between Pribilof Canyon and Zhemchug Canyon. Depths ranged from 130 m to 796 m. Thirty-five taxa of fishes and crabs were identified (Table 18). Vertical habitat was dominated by *Halipteris* sp. and hexactinellids (Table 19). Heights ranged from 2.2 cm to 205.6 cm (Table 20).

Pribilof Canyon to Zhemchug Canyon

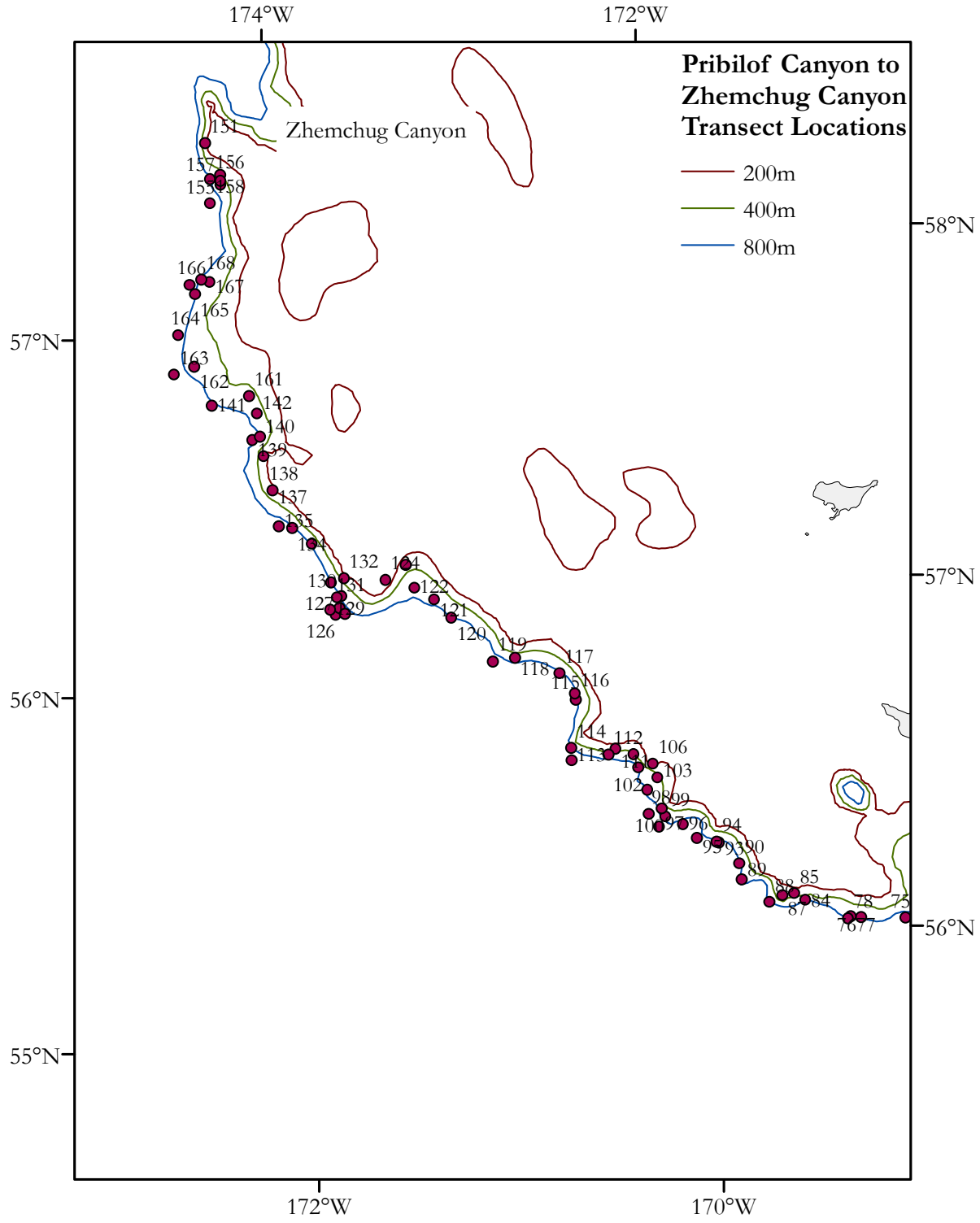


Figure 14. -- Survey transect locations, Pribilof Canyon to Zhemchug Canyon.

SITE SUMMARY: Pribilof Canyon to Zhemchug Canyon

Nineteen different substrates were identified between Pribilof Canyon and Zhemchug Canyon (Table 17). The majority of the observations were sand and mud, with sand being identified as the primary substrate over 75% of the time. Boulders were seen at 25 of the transects.

Fishes and crabs were plentiful and diverse (Table 18). More fish and crab taxa (35) were identified in the Pribilof-Zhemchug inter-canyon region than anywhere else. Popeye grenadier, sculpins, and eelpouts were the most abundant followed by Pacific ocean perch. Rockfishes (n = 514) comprised 19% of the species composition.

Halipteris (n = 14,977) far outnumbered all of corals and sponges, occurring at 31 transects and at all depths observed (Table 19). Demospongiae was the next most abundant (n = 6,047) also occurring at all depths. Hexactinellida was identified at 30 transects. Isididae (n = 60) was the most abundant coral but only occurred at depths greater than 400 m. *Plumarella* (n = 49) the next most abundant coral was seen at four transects with depths ranging from 207-474 m.

Coral, sponge, and sea whip heights ranged from 2.2 cm to 204.4 cm with *Halipteris* sp. being the shortest and *Halipteris willemoesi* being the tallest (Table 20). The tallest Hexactinellida (205.6 cm) of the survey was seen in this region at transect 97.

Sea whips, corals, and sponges were found in fifty-two of the sixty-eight transects. Sea whips and sponges were found throughout the region (Figs. 15, 17). Primoidae and Isididae were only identified in the southern transects (Fig. 16).

Table 17. -- Summary of substrates observed at transects (n = 68) between Pribilof Canyon and Zhemchug Canyon.

Substrate	Depth range (m)	Number of transects with observed substrate	Percent of observations
Sand.mud	130 - 770	52	61%
Mud*	367 - 796	7	11%
Mixed coarse	167 - 474	11	9%
Sand.mixed coarse	142 - 770	15	9%
Sand*	133 - 491	6	5%
Mixed coarse.cobble	218 - 455	3	1%
Mixed coarse.boulder	188 - 760	6	1%
High bedrock	759 - 760	2	1%
Sand.cobble	340 - 760	5	1%
Sand.boulder	142 - 770	12	<1%
Sand.gravel	455 - 770	3	<1%
Cobble.mixed coarse	285 - 285	1	<1%
Boulder.cobble	455 - 455	1	<1%
Cobble.sand	474 - 474	1	<1%
Boulder*	137 - 759	2	<1%
Mixed coarse.sand	474 - 474	1	<1%
Mixed coarse.mud	474 - 474	1	<1%
Gravel.mud	148 - 148	1	<1%
Mixed coarse.gravel	455 - 455	1	<1%

*Primary and secondary substrates were the same.

SITE SUMMARY: Pribilof Canyon to Zhemchug Canyon

Table 18. -- Summary of fishes and crabs identified at transects (n = 68) between Pribilof Canyon and Zhemchug Canyon.

Species/Grouping	Number of occurrences	Number of transects with occurrences	Mean transect depth range (m)	Mean density (individuals/m^2)
Popeye grenadier	482	15	139 - 796	0.05
Sculpin unid.	403	59	130 - 766	0.01
Eelpout unid.	385	52	130 - 796	0.01
Pacific ocean perch	251	20	136 - 340	0.01
Poacher unid.	156	45	134 - 796	<0.01
Snailfish unid.	116	23	218 - 796	0.01
Shortspine thornyhead	115	22	311 - 796	0.01
Rockfish unid.	109	18	133 - 515	<0.01
Grenadier unid.	108	10	662 - 777	0.01
Giant grenadier	106	25	370 - 796	0.01
Chionoecetes sp.	90	22	130 - 796	0.01
Flatfish unid.	84	35	130 - 726	<0.01
Deepsea sole	74	4	695 - 770	0.04
Searcher unid.	27	10	137 - 218	<0.01
Skate unid.	27	21	138 - 770	<0.01
Rex sole	26	12	137 - 583	<0.01
Arrowtooth/Kamchatka flounder	25	14	130 - 537	<0.01
Roundfish unid.	23	17	130 - 796	<0.01
Golden king crab	21	7	218 - 474	<0.01
Crab unid.	20	11	138 - 770	<0.01
Walleye pollock	20	12	130 - 431	<0.01
Shortraker rockfish	17	2	285 - 340	0.01
Blackspotted rockfish	10	4	177 - 340	<0.01
Flathead sole	10	7	130 - 515	<0.01
Harlequin rockfish	9	3	148 - 311	<0.01
Cod/pollock unid.	7	3	142 - 356	<0.01
Pacific cod	7	5	168 - 306	<0.01
Pacific halibut	6	6	134 - 474	<0.01
Sablefish	2	2	647 - 662	<0.01
King crab unid.	2	2	770 - 777	<0.01
Rougheye rockfish	2	1	340 - 340	<0.01
Greenland turbot	2	2	434 - 647	<0.01
Atka mackerel	1	1	142 - 142	<0.01
Northern rockfish	1	1	214 - 214	<0.01
Scarlet king crab	1	1	721 - 721	<0.01

Table 19. -- Summary of coral, sponge, and sea whip taxa identified at transects (n = 68) between Pribilof Canyon and Zhemchug Canyon.

Species/Grouping	Number of occurrences	Number of transects with occurrences	Mean transect depth range (m)	Mean density (individuals/m^2)
Halipteris sp.	13,531	31	130 - 760	0.49
Demospongiae	6,043	26	148 - 770	0.14
Halipteris sp. (damaged)	1,446	19	130 - 719	0.06
Hexactinellida	1,396	23	167 - 770	0.04
Isididae	60	4	455 - 760	0.01
Plumarella sp.	49	6	207 - 474	0.01
Swiftia sp.	13	4	455 - 770	<0.01
Plexauridae	7	4	455 - 759	<0.01
Demospongiae (damaged)	4	1	356 - 356	<0.01
Porifera	3	2	721 - 760	<0.01
Isididae (damaged)	2	2	455 - 760	<0.01

**Halipteris* sp. (damaged) is not accounted for in the *Halipteris* sp. grouping.

Table 20. -- Summary of coral, sponge, and sea whip mean height from transects completed between Pribilof Canyon and Zhemchug Canyon.

Species/Grouping	Number measured	Mean height (cm)	Minimum height (cm)	Maximum height (cm)
Demospongiae	496	15.5	10.0	85.3
Halipteris sp.	548	15.4	2.2	49.4
Halipteris willemoesi	914	81.3	3.0	205.6
Hexactinellida	392	27.5	10.1	204.4
Isididae	26	53.7	20.1	116.2
Plexauridae	2	21.2	14.6	27.7
Plumarella sp.	19	20.5	6.7	44.0

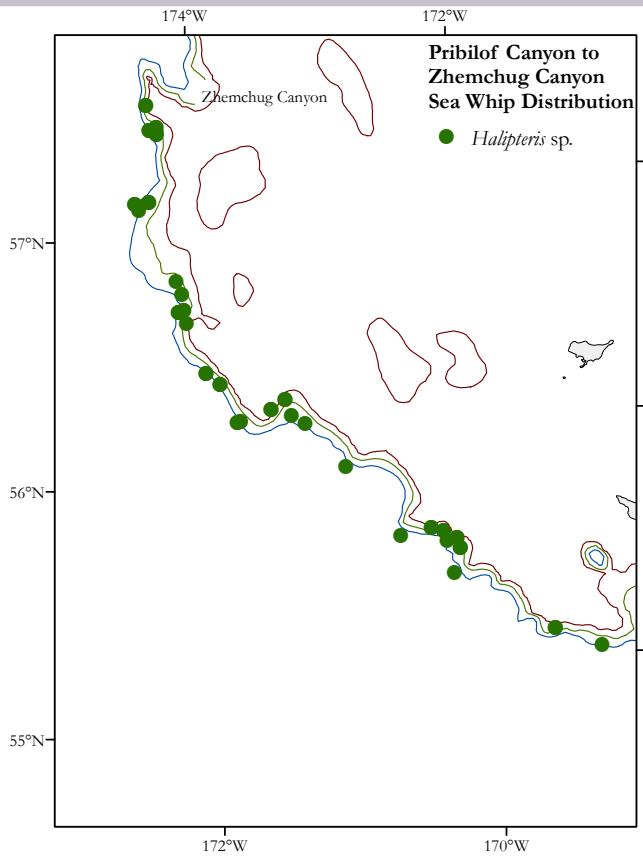


Figure 15. -- Sea whip distribution, Pribilof Canyon to Zhemchug Canyon.

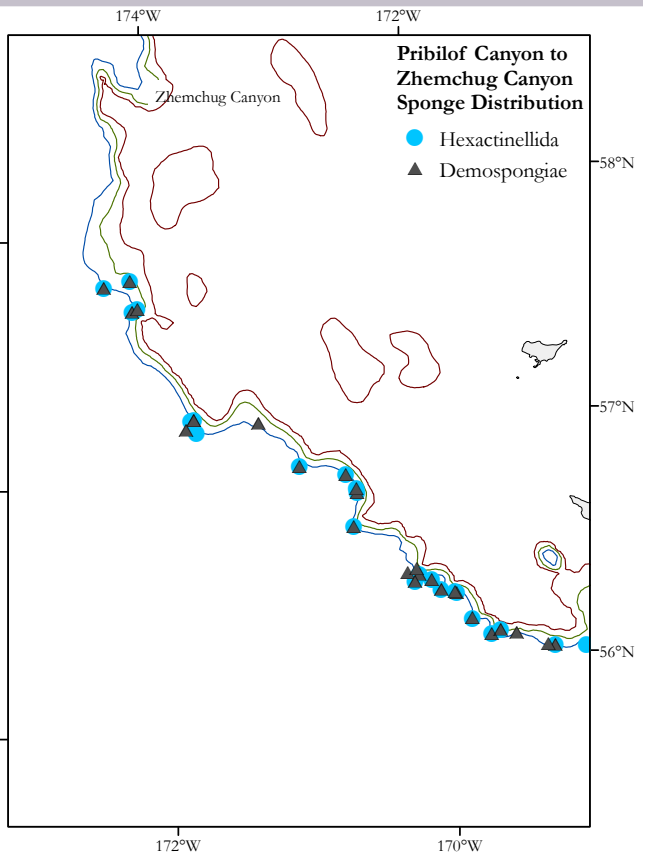


Figure 17. -- Sponge distribution, Pribilof Canyon to Zhemchug Canyon.

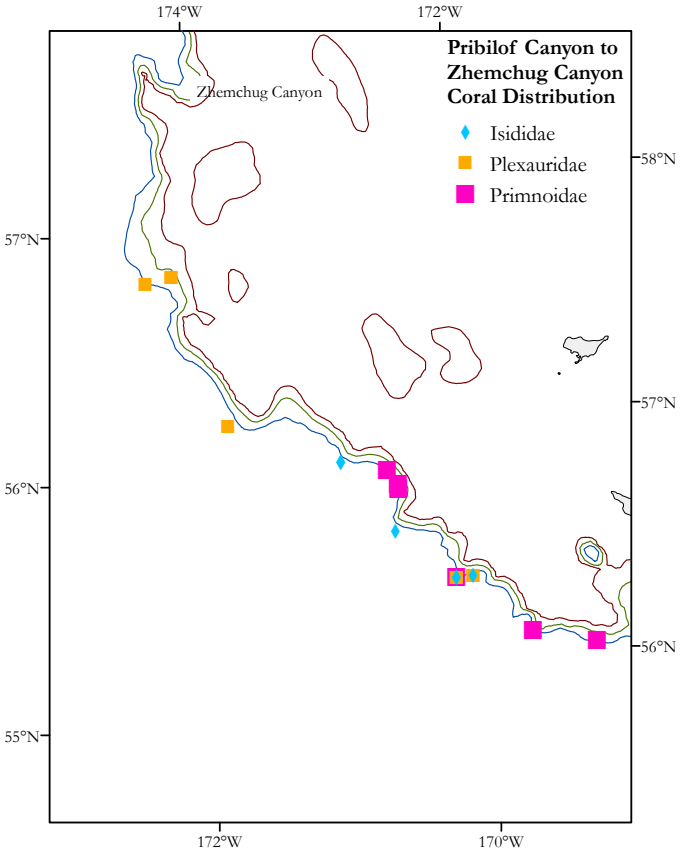
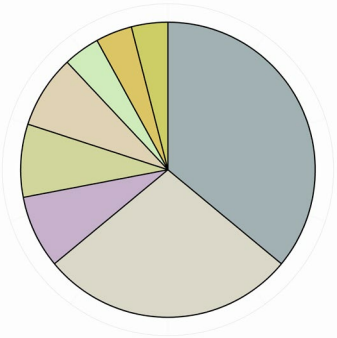
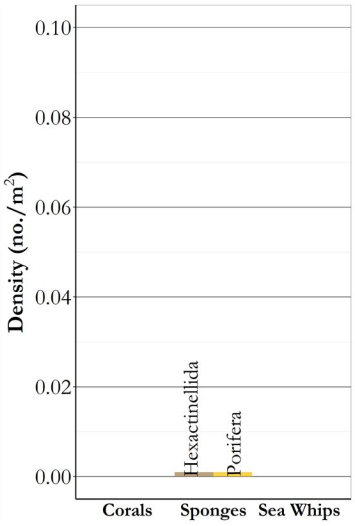


Figure 16. -- Coral distribution, Pribilof Canyon to Zhemchug Canyon.

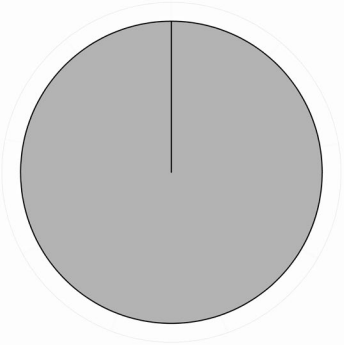
Area: Pribilof Canyon to Zhemchug Canyon					Transect 75
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/17/14	56.02	-169.40	1,216	721	3.2

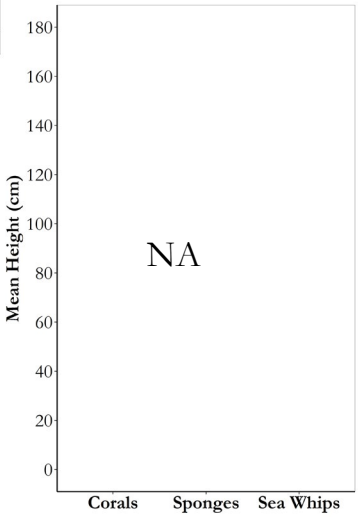
Fish and Crab Composition (n = 25)





Substrate Composition





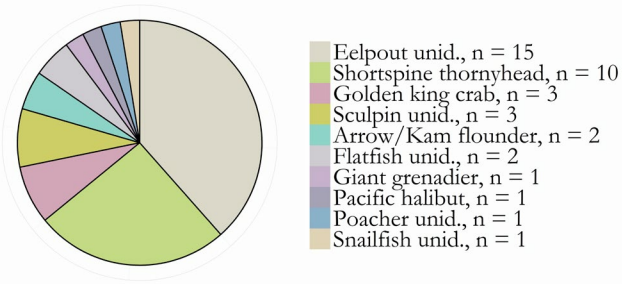
Images

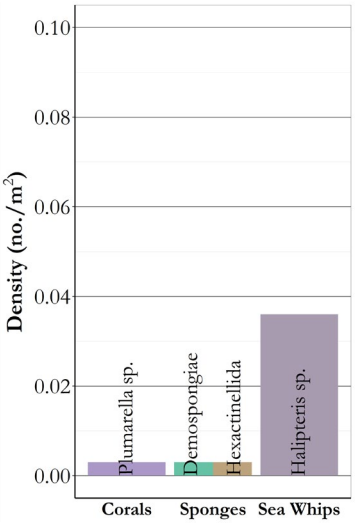
Summary - description of transect

Transect 75: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.021 individuals/m^2. Eelpouts and popeye grenadiers accounted for 64% of the enumerated taxa. Vertical habitat consisted of 1 Porifera and 1 Hexactinellida, with a density of < 0.01 individuals/m^2. No corals were observed.

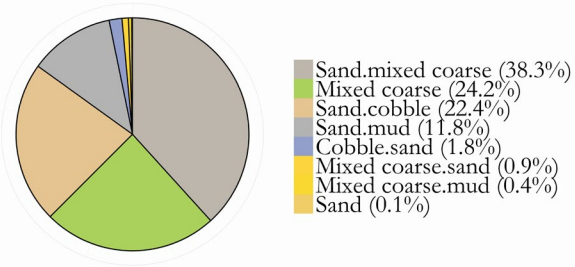
Area: Pribilof Canyon to Zhemchug Canyon					Transect 76
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/17/14	55.99	-169.63	772	474	3.7

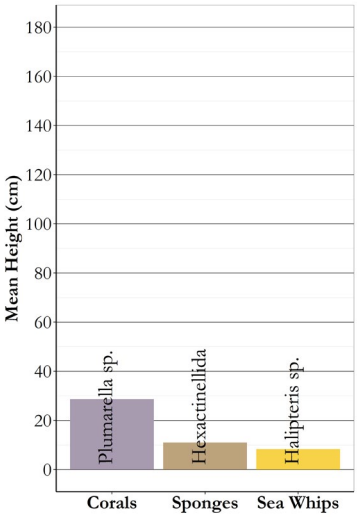
Fish and Crab Composition (n = 39)





Substrate Composition





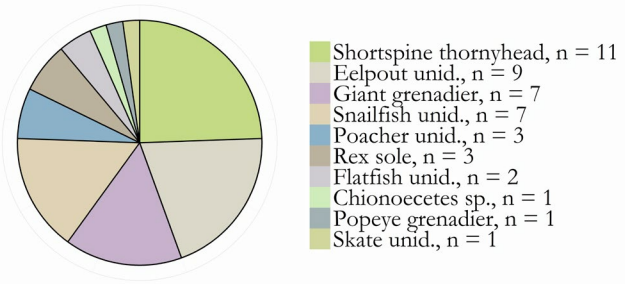
Images

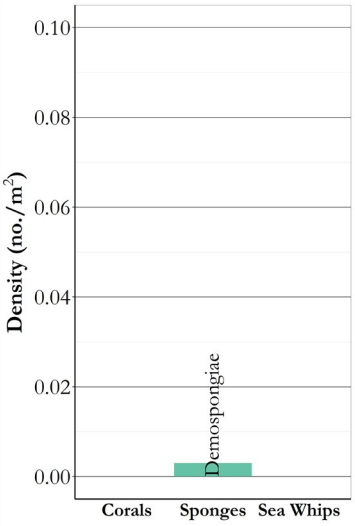
Summary - description of transect

Transect 76: Primary and secondary substrates were more diverse than surrounding transects. Sand/mixed coarse and mixed coarse accounted for over 60% of the substrate. Overall fish and crab density was 0.05 individuals/m^2. Eelpouts and shortspine thornyheads accounted for 64% of the enumerated taxa. Vertical habitat consisted of 2 *Plumarella* sp., 28 sea whips (*Halipteris* sp.), 2 Demospongiae, and 2 Hexactinellida, with a density of 0.04 individuals/m^2.

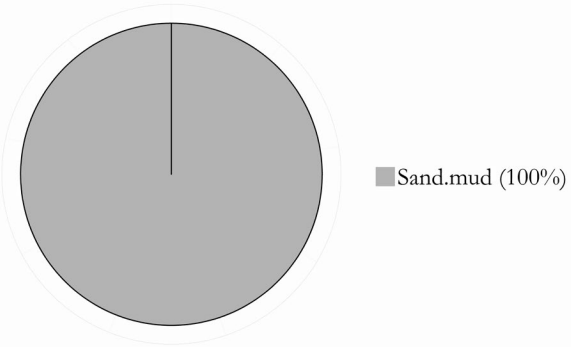
Area: Pribilof Canyon to Zhemchug Canyon					Transect 77
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/17/14	55.99	-169.68	1,213	583	3.4

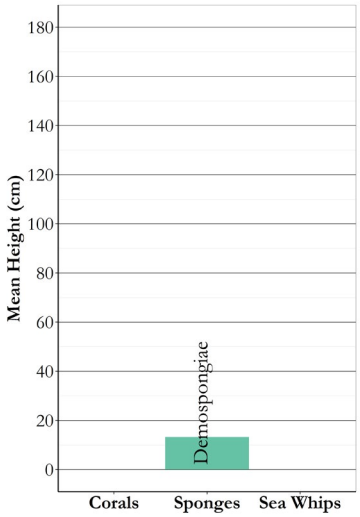
Fish and Crab Composition (n = 45)



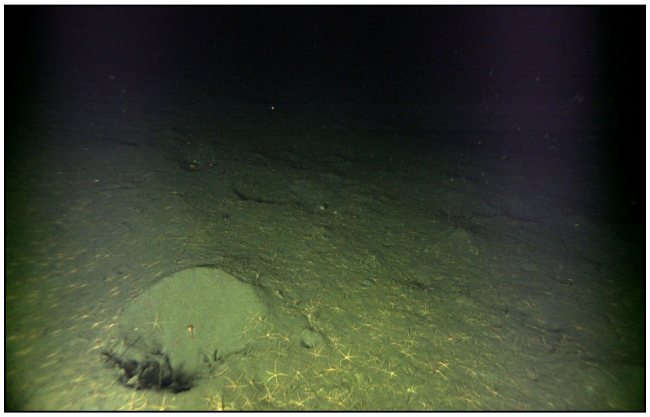


Substrate Composition





Images

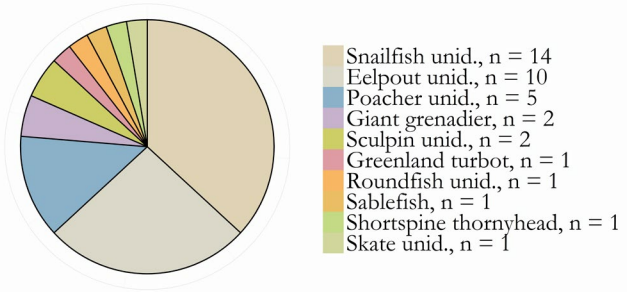


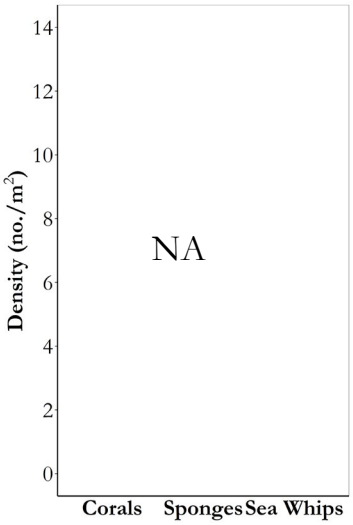
Summary - description of transect

Transect 77: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.04 individuals/m^2. Shortspine thornyheads and eelpouts accounted for 44% of the enumerated taxa. Giant grenadiers and snailfishes were the next most abundant taxa. Vertical habitat consisted of 4 Demospongiae, with a density of < 0.01 individuals/m^2. No corals were observed.

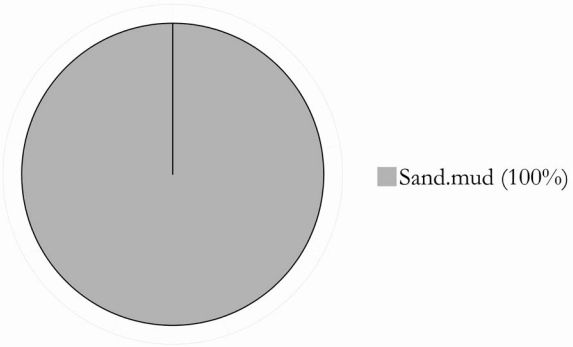
Area: Pribilof Canyon to Zhemchug Canyon					Transect 78
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/17/14	55.98	-169.69	848	647	3.3

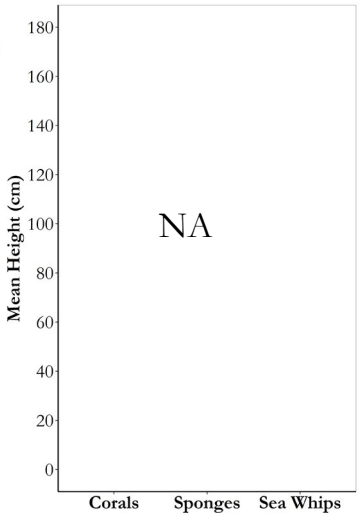
Fish and Crab Composition (n = 38)





Substrate Composition





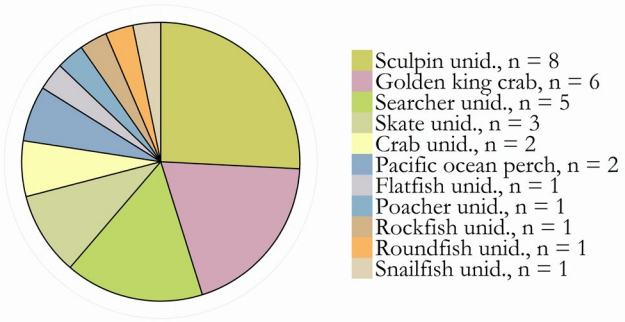
Images

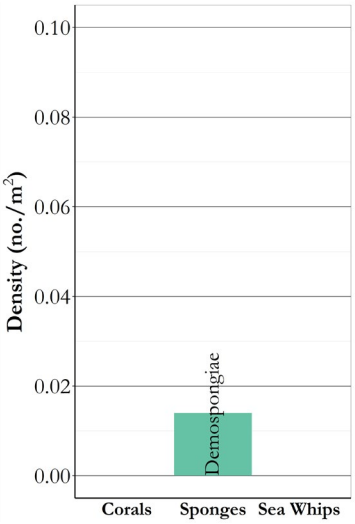
Summary - description of transect

Transect 78: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.05 individuals/m^2. Snailfishes and eelpouts accounted for 63% of the enumerated taxa. No vertical habitat was observed.

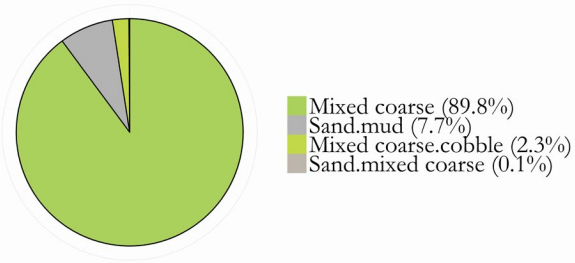
Area: Pribilof Canyon to Zhemchug Canyon					Transect 84
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/18/14	56.00	-169.93	1,231	218	3.9

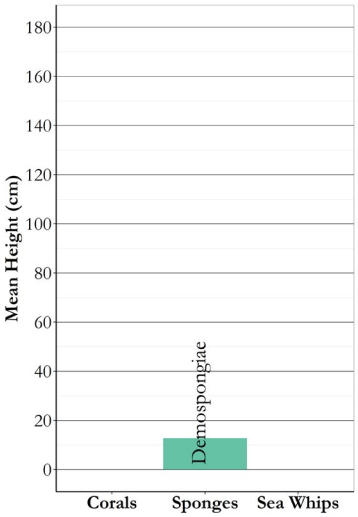
Fish and Crab Composition (n = 31)





Substrate Composition





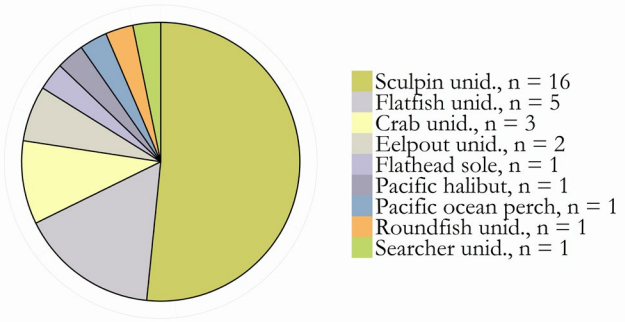
Images

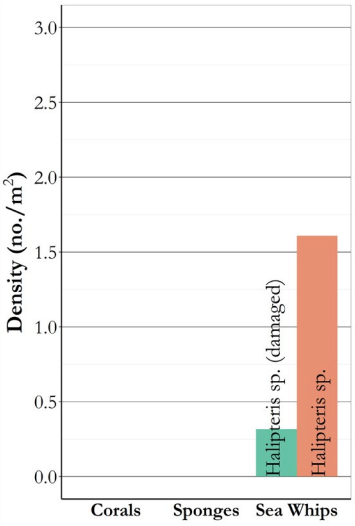
Summary - description of transect

Transect 84: Primary and secondary substrates consisted of mixed coarse (90%), sand and mud (8%), and cobble (2%). Overall fish and crab density was 0.03 individuals/m^2. Transect 84 was more diverse than most transects in the area with 11 taxa identified. Sculpins, golden king crabs, and searchers were the most abundant species. Vertical habitat consisted of 8 Demospongiae with a mean height of 17.3 cm. No corals were observed.

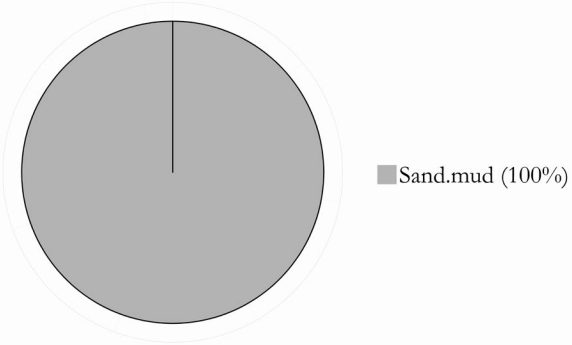
Area: Pribilof Canyon to Zhemchug Canyon					Transect 85
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/18/14	56.01	-170.00	1,387	141	4.0

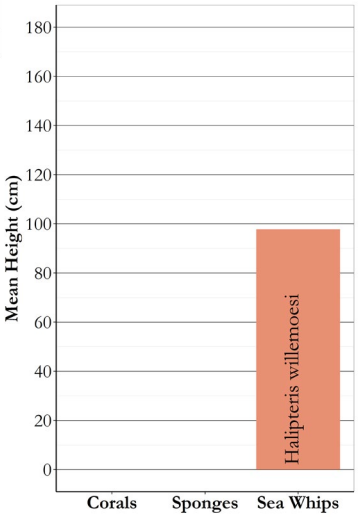
Fish and Crab Composition (n = 31)



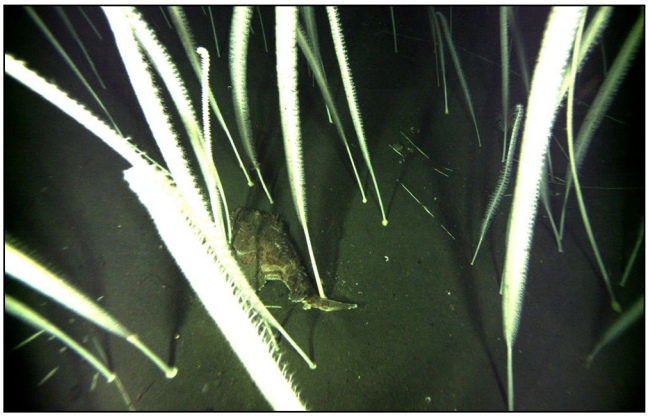


Substrate Composition





Images

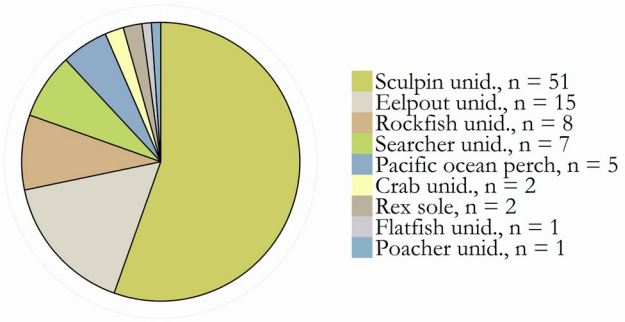


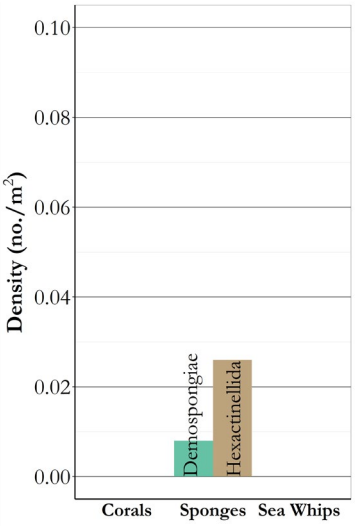
Summary - description of transect

Transect 85: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.02 individuals/m^2. Species composition consisted of 31 individuals in 9 taxa. Sculpins comprised 52% of the individuals, with flatfishes being the next most abundant. Vertical habitat consisted of 394 sea whips ranging in height from 10.3 to 205.6 cm, and a mean of 97.8 cm. No other corals or sponges were observed.

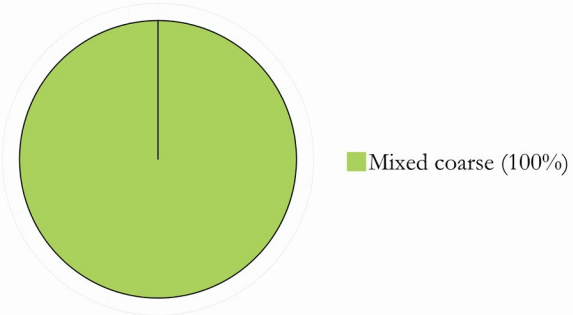
Area: Pribilof Canyon to Zhemchug Canyon					Transect 87
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/18/14	56.00	-170.06	1,814	167	4.1

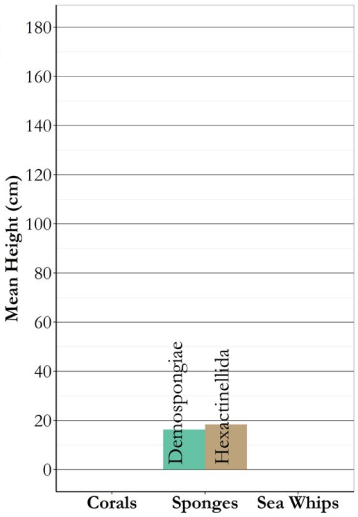
Fish and Crab Composition (n = 92)



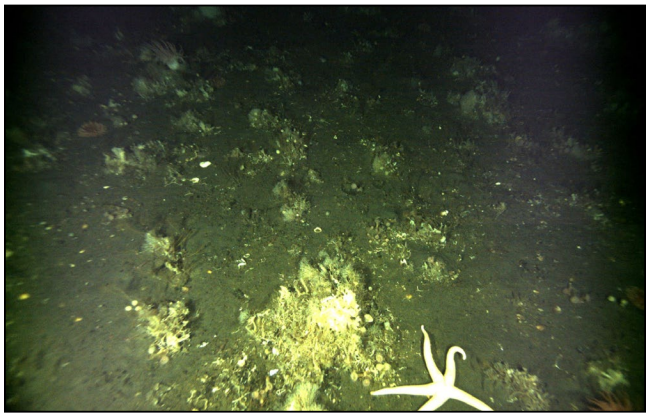


Substrate Composition





Images

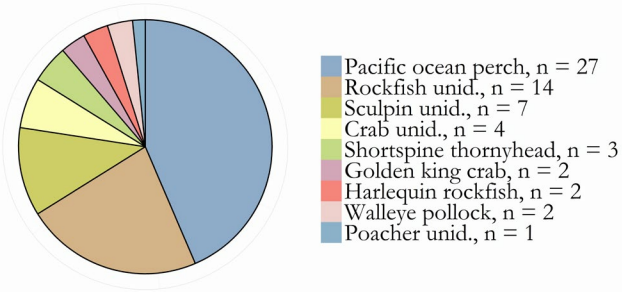


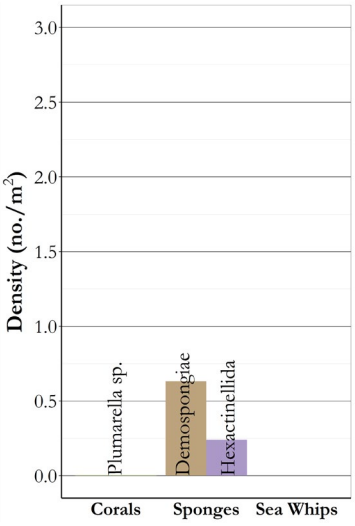
Summary - description of transect

Transect 87: Primary and secondary substrates consisted entirely of mixed coarse. Overall fish and crab density was 0.05 individuals/m^2. Sculpins accounted for 55% of the enumerated taxa. The next most abundant taxa were eelpouts at 16%. Vertical habitat consisted of 15 Demospongiae and 48 Hexactinellida, with a density of 0.04 individuals/m^2. Demospongiae heights ($n = 8$) ranged from 10.1 cm to 28.7 cm with a mean of 28.7 cm. Hexactinellida heights ($n = 18$) ranged from 10.1 cm to 47.8 cm, with a mean of 18.4 cm. No corals were observed.

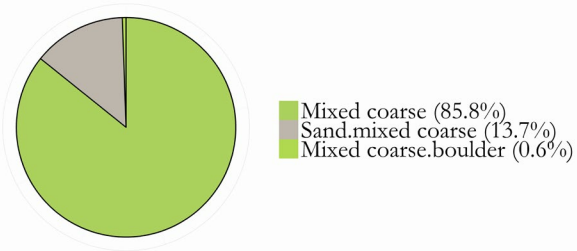
Area: Pribilof Canyon to Zhemchug Canyon					Transect 88
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/18/14	55.97	-170.12	1,621	311	3.9

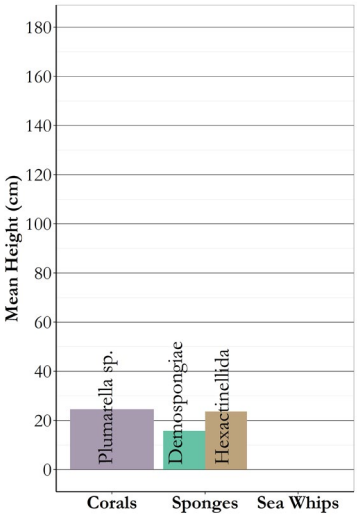
Fish and Crab Composition (n = 62)



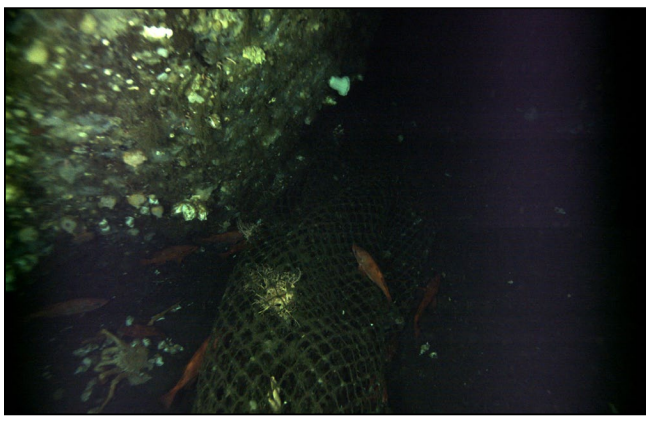


Substrate Composition





Images

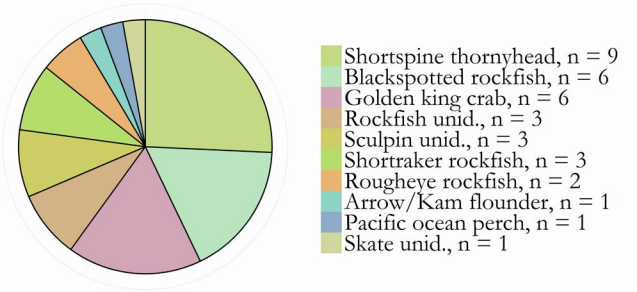


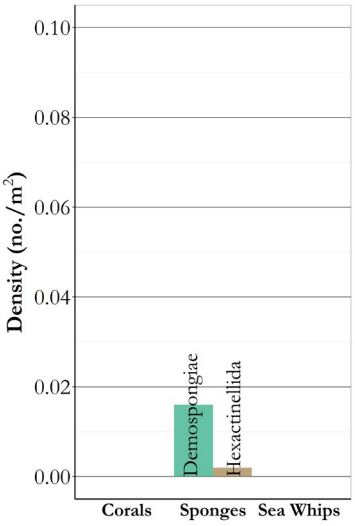
Summary - description of transect

Transect 88: Primary and secondary substrates consisted of mixed coarse (86%), sand with mixed coarse (14%), and boulders (1%). Overall fish and crab density was 0.04 individuals/m^2. Pacific ocean perch accounted for 44 % of the enumerated taxa. The next most abundant taxa were rockfishes at 23%. Vertical habitat consisted of Demospongiae, Hexactinellida, and *Plumarella* sp. with an overall density of 0.88 individuals/m^2. Demospongiae heights (n = 1,025) ranged from 10.1 cm to 46.4 cm with a mean of 15.8 cm. Hexactinellida heights (n = 155) ranged from 10.1 cm to 134.4 cm, with a mean of 23.6 cm. *Plumarella* sp. (n = 2) ranged from 21.4 to 27.8 with a mean of 24.6cm. Derelict fishing gear was observed wrapped around a large boulder.

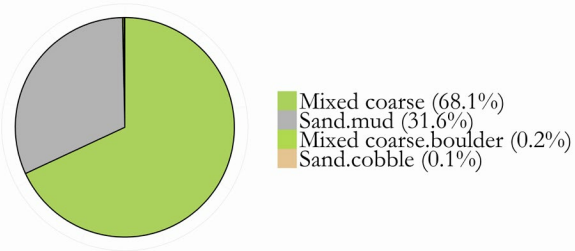
Area: Pribilof Canyon to Zhemchug Canyon					Transect 89
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/18/14	56.01	-170.28	1,210	340	3.8

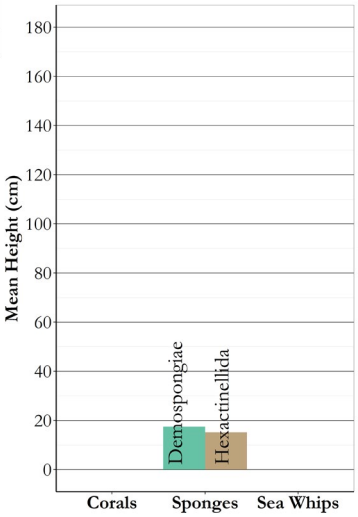
Fish and Crab Composition (n = 35)



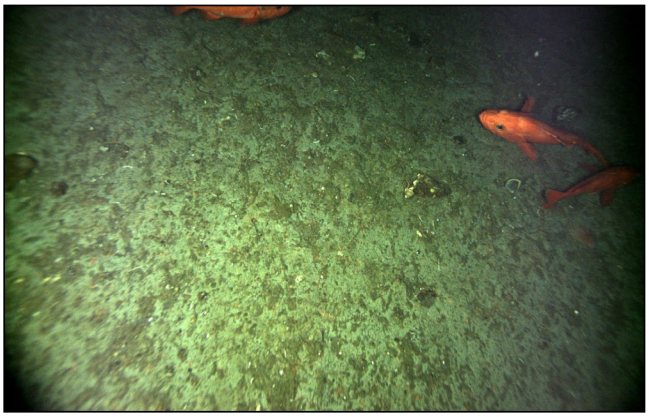


Substrate Composition





Images



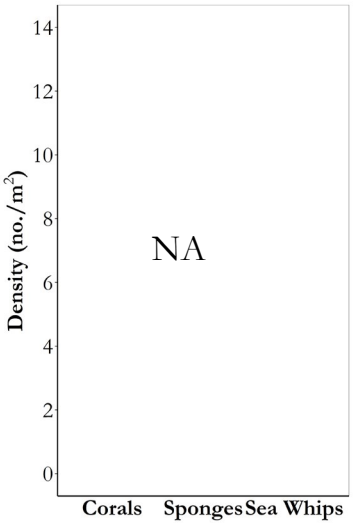
Summary - description of transect

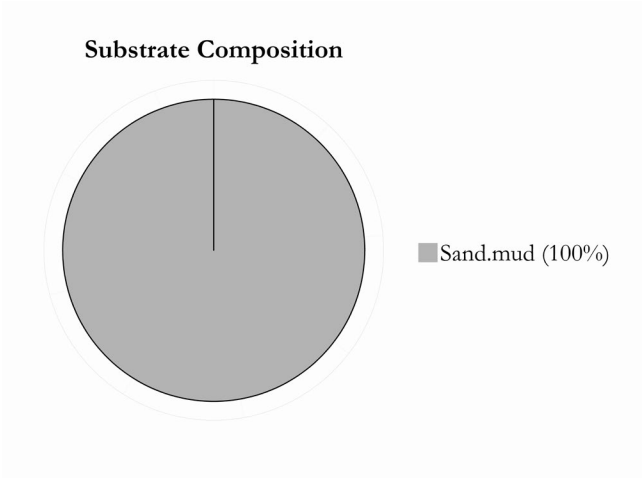
Transect 89: Primary and secondary substrates consisted of mixed coarse(68%), mixed coarse and boulders (< 1%), sand and cobble (< 1%), and sand and mud (32%). Overall fish and crab density was 0.03 individuals/m^2. Shortspine thornyheads accounted for 26% of the enumerated taxa. The next most abundant taxa were blackspotted rockfishes and golden king crabs at 17% each%. Vertical habitat consisted of Demospongiae (n = 19) and Hexactinellida (n = 3), with a density of 0.02 individuals/m^2. Demospongiae heights (n = 4) ranged from 14.5 cm to 21.5 cm with a mean of 17.4 cm. Only one Hexactinellida was measured, with a height of 15.1 cm. No corals were observed.

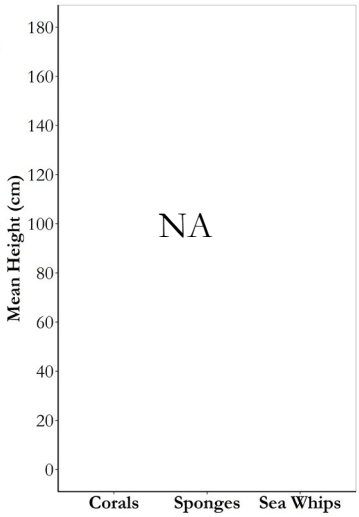
Area: Pribilof Canyon to Zhemchug Canyon					Transect 90
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/18/14	56.06	-170.32	84	420	3.8

Fish and Crab Composition

NA







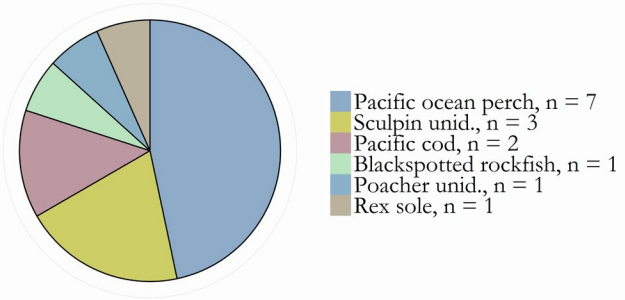
Images

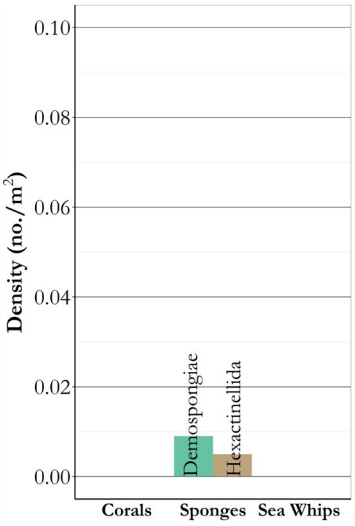
Summary - description of transect

Transect 90: Primary and secondary substrates consisted of sand and mud. Only 12% of the frames were on bottom. The camera spent approximately 88% of the time off bottom with no visual input. No fishes, crabs, sponges, or corals were observed.

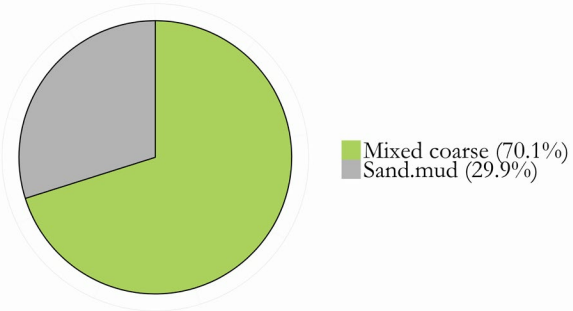
Area: Pribilof Canyon to Zhemchug Canyon					Transect 93
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/19/14	56.10	-170.45	1,018	177	4.4

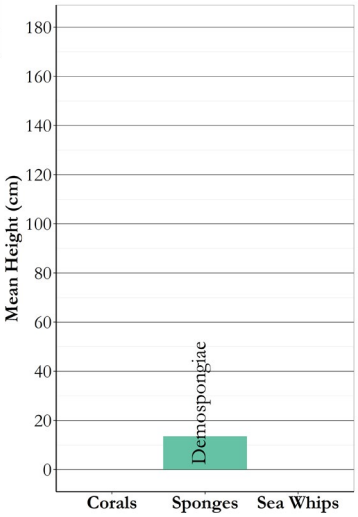
Fish and Crab Composition (n = 15)





Substrate Composition





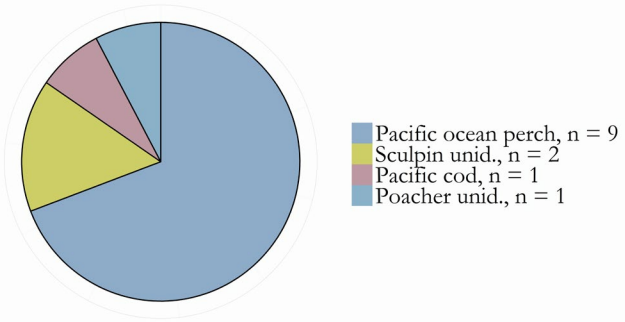
Images

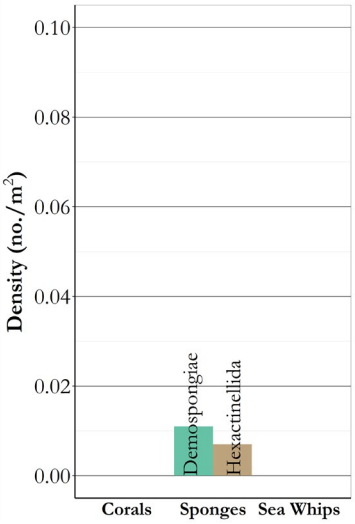
Summary - description of transect

Transect 93: Primary and secondary substrates consisted of mixed coarse and sand-mud . Overall fish and crab density was 0.02 individuals/m^2. Pacific ocean perch accounted for 40% of the enumerated taxa. The next most abundant taxa were sculpins at 20%. Vertical habitat consisted of Demospongiae ($n = 9$) and Hexactinellida ($n = 5$), with a density of 0.01 individuals/m^2. Demospongiae heights ($n = 3$) ranged from 11.3 cm to 17.2 cm with a mean of 13.5 cm. Hexactinellida were not measured. No corals were observed.

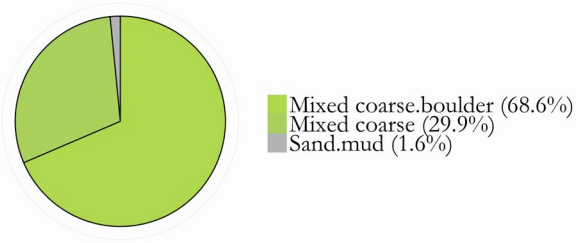
Area: Pribilof Canyon to Zhemchug Canyon					Transect 94
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/19/14	56.10	-170.46	712	188	4.4

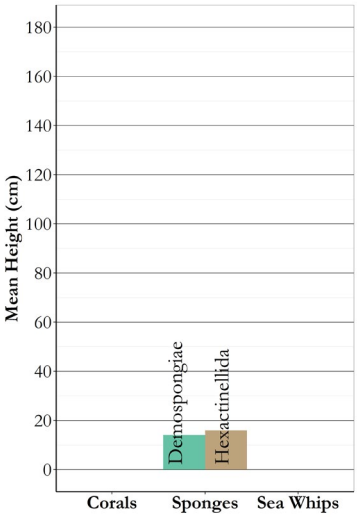
Fish and Crab Composition (n = 13)





Substrate Composition





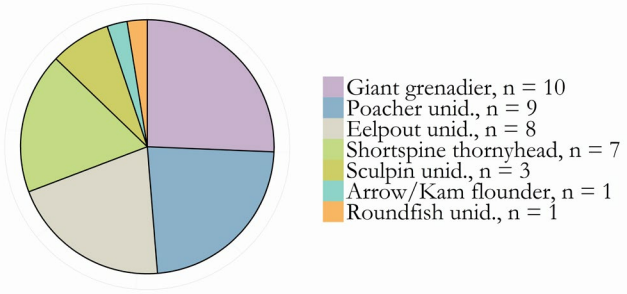
Images

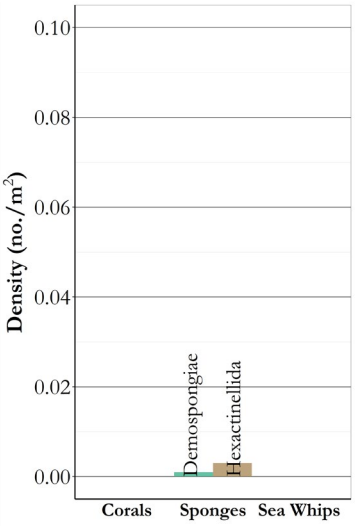
Summary - description of transect

Transect 94: Primary and secondary substrates consisted of sand and mud (2%), mixed coarse (30%), and mixed coarse with boulders (69%). Overall fish and crab density was 0.02 individuals/m^2. Pacific ocean perch accounted for 69% of the enumerated taxa. Sculpins, Pacific cod, and poachers comprised the remaining 31% of the observations. Vertical habitat consisted of Demospongiae ($n = 8$) and Hexactinellida ($n = 5$), with a density of 0.02 individuals/m^2. Demospongiae heights ($n = 4$) ranged from 10.9 cm to 18.6 cm with a mean of 14.1 cm. Hexactinellida heights ($n = 3$) ranged from 10.3 cm to 23.9 cm, with a mean of 14.9 cm. No corals were observed.

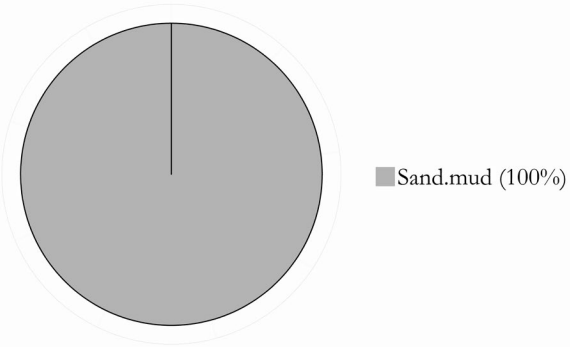
Area: Pribilof Canyon to Zhemchug Canyon					Transect 95
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/19/14	56.10	-170.57	722	523	3.7

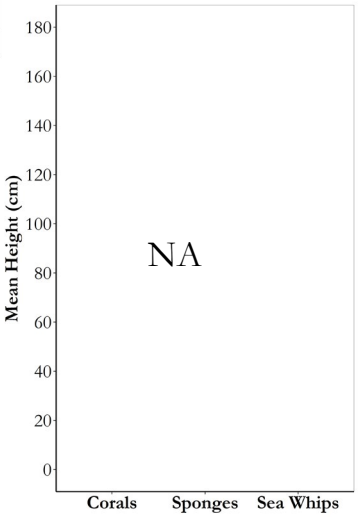
Fish and Crab Composition (n = 39)





Substrate Composition





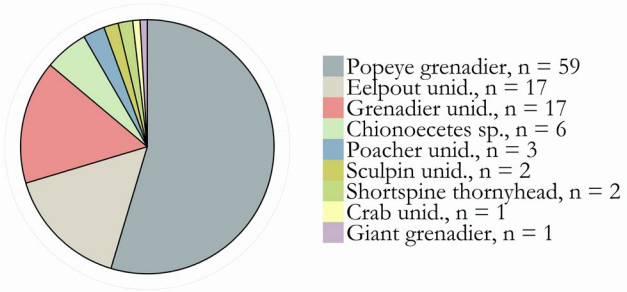
Images

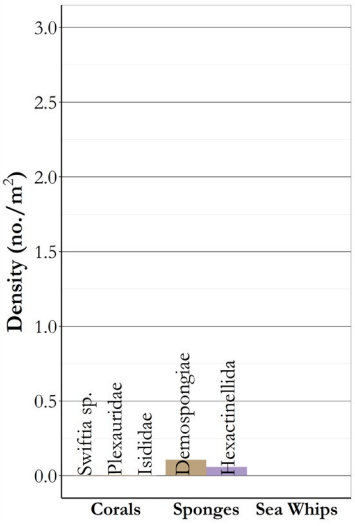
Summary - description of transect

Transect 95: Primary and secondary substrates consisted of sand and mud. Overall fish and crab density was 0.05 individuals/m^2. Giant grenadier accounted for 26% of the enumerated taxa. The next most abundant taxa were poachers, eelpouts and shortspine thornyheads comprising at 62% of the observed individuals. Vertical habitat consisted of 1 Demospongiae and 2 Hexactinellida, with a density of < 0.01 individuals/m^2. No sponge height measurements were recorded for Demospongiae or Hexactinellida. No corals were observed.

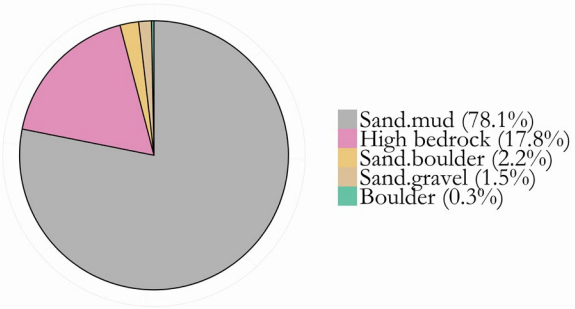
Area: Pribilof Canyon to Zhemchug Canyon					Transect 96
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/19/14	56.13	-170.66	667	759	3.3

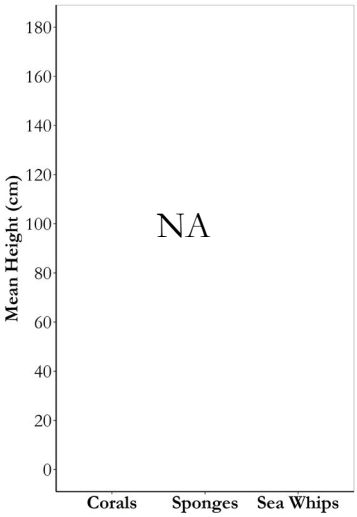
Fish and Crab Composition (n = 108)





Substrate Composition





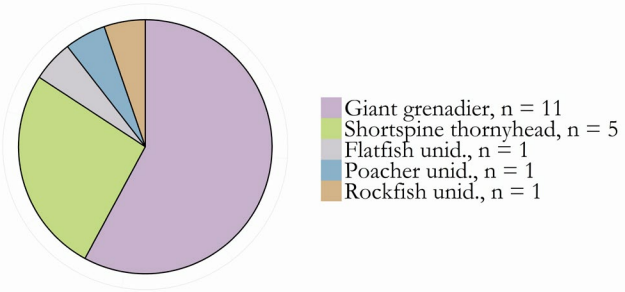
Images

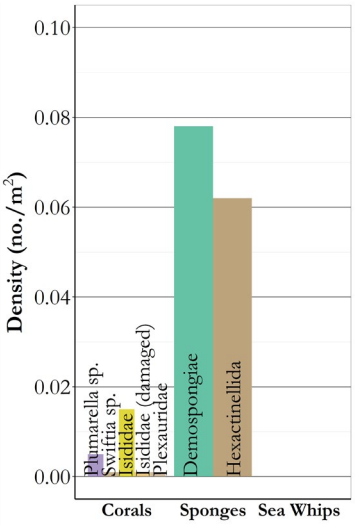
Summary - description of transect

Transect 96: Primary and secondary substrates for Transect 96 were very diverse. Sand and mud (78%) dominated the transect but high bedrock (18%), sand and boulder (2%), sand and gravel (1%), and boulder (< 1%) were also identified . Overall fish and crab density was 0.162 individuals/m^2. Popeye grenadier accounted for 55% of the enumerated taxa. The next most abundant taxa were grenadiers and eelpouts for a combined 32%. Vertical habitat consisted of Isididae, Plexauridae, *Swiftia* sp., Demospongiae, and Hexactinellida, with a total density of 0.17 individuals/m^2. Demospongiae ($n = 71$) and Hexactinellida ($n = 39$) were the most abundant. No height measurements were taken for any of the taxa.

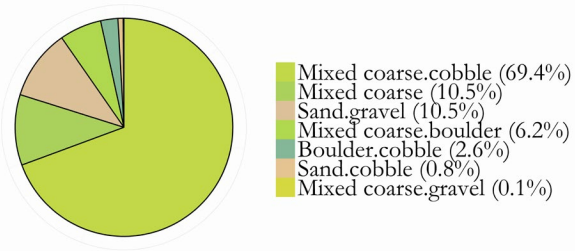
Area: Pribilof Canyon to Zhemchug Canyon					Transect 97
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/19/14	56.11	-170.77	1,509	455	3.8

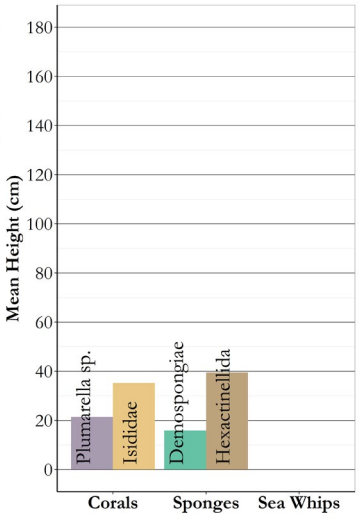
Fish and Crab Composition (n = 19)



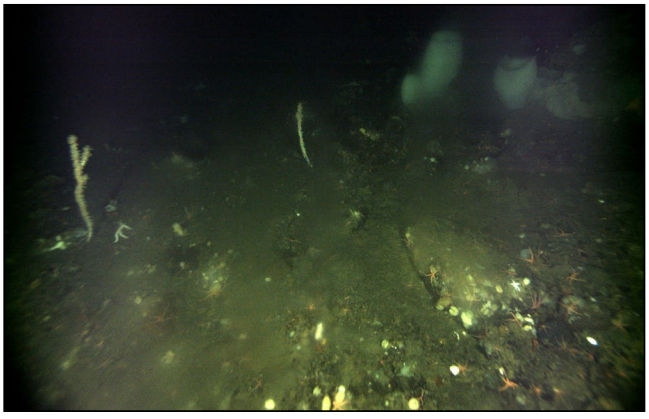


Substrate Composition





Images

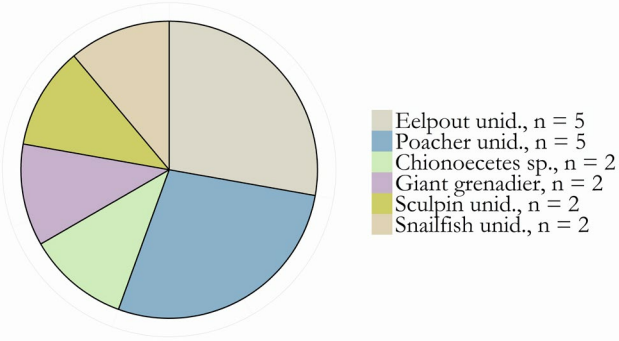


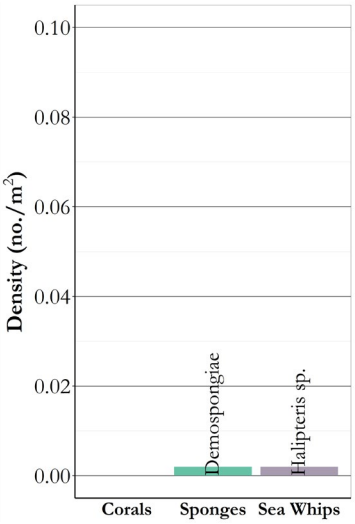
Summary - description of transect

Transect 97: Primary and secondary substrates consisted of mixed coarse and cobble (69%), mixed coarse (10%), sand and gravel (10%), mixed coarse and boulder (6%), and boulder and cobble (3%). Overall fish and crab density was 0.01 individuals/m^2. Giant grenadier accounted for 58% of the enumerated taxa. The next most abundant taxa were shortspine thornyheads at 26%. Flatfishes, rockfishes, and poachers were also identified. Vertical habitat consisted of Hexactinellida ($n = 93$), Demospongiae ($n = 118$), Isididae ($n = 23$), and *Plumarella* sp. ($n = 8$), *Swiftia* sp. ($n = 2$), and Plexauridae ($n = 2$), with an overall density of 0.16 individuals/m^2. Demospongiae heights ($n = 16$) ranged from 10.0 cm to 24.3 cm with a mean of 15.9 cm. Hexactinellida heights ($n = 30$) ranged from 14.3 cm to 204.4 cm, with a mean of 39.5 cm. Isididae ($n = 13$) ranged from 20.1 cm to 62.0 cm, with a mean of 35.2 cm. *Plumarella* sp. heights ($n = 13$) ranged from 14.4 cm to 34.6 cm, with a mean of 21.4 cm. No sea whips were observed.

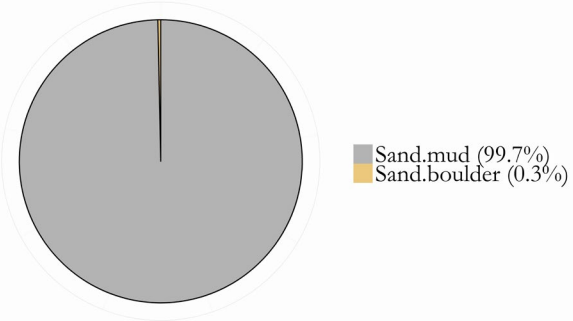
Area: Pribilof Canyon to Zhemchug Canyon					Transect 98
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/19/14	56.13	-170.84	930	629	3.6

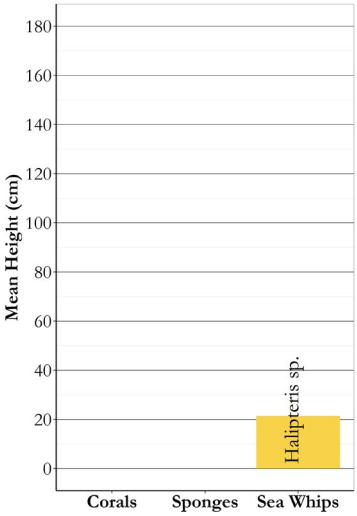
Fish and Crab Composition (n = 18)



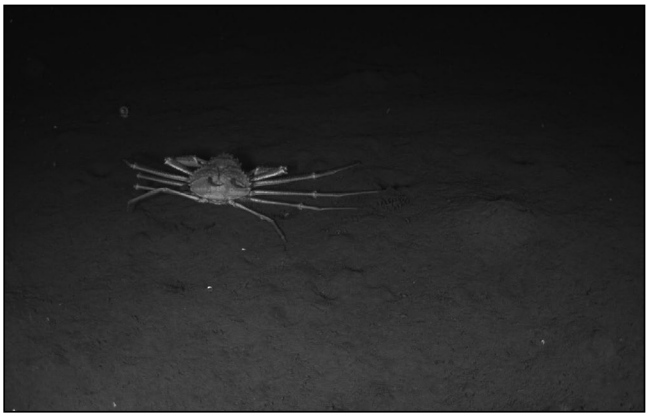


Substrate Composition





Images

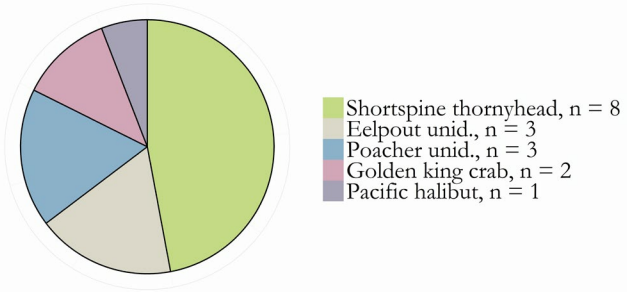


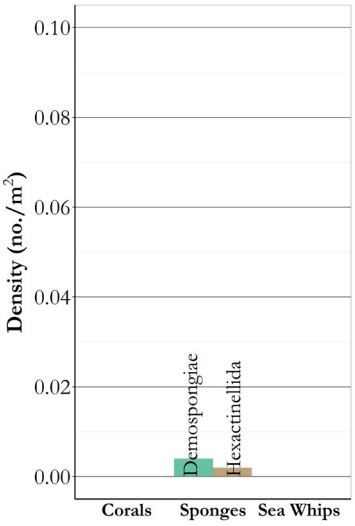
Summary - description of transect

Transect 98: Primary and secondary substrates consisted of sand and mud (99%) and sand and boulder (< 1%). Overall fish and crab density was 0.02 individuals/m^2. Poachers and eelpouts accounted for 56% of the enumerated taxa. *Chionoecetes* sp., giant grenadier, sculpins, and snailfishes comprised the remaining taxa. Vertical habitat consisted of sea whips and Demospongiae, with a density of < 0.01 individuals/m^2. Only one height measurement (21.4 cm) was recorded for *Halipteris* sp. No other corals were observed.

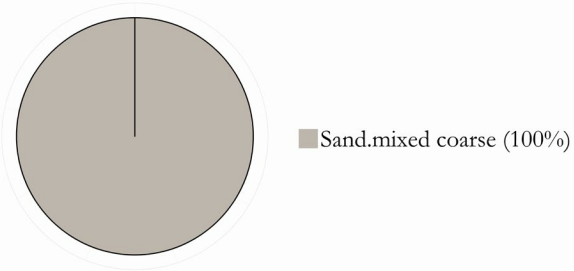
Area: Pribilof Canyon to Zhemchug Canyon					Transect 99
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/19/14	56.14	-170.76	512	357	3.9

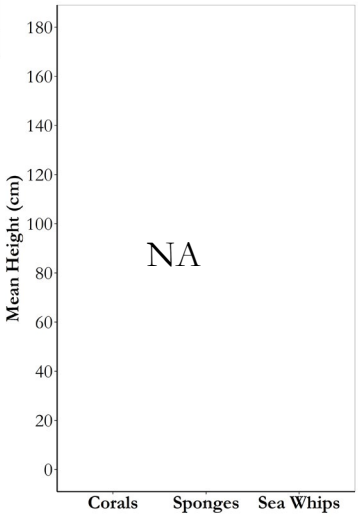
Fish and Crab Composition (n = 17)





Substrate Composition





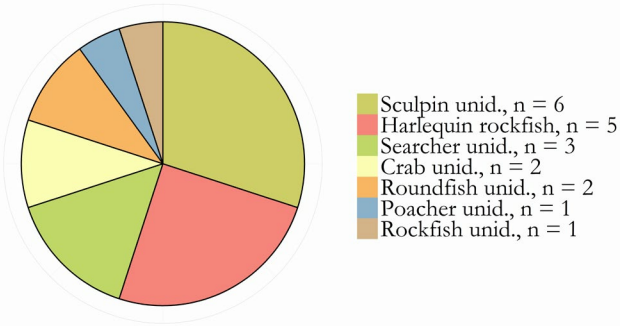
Images

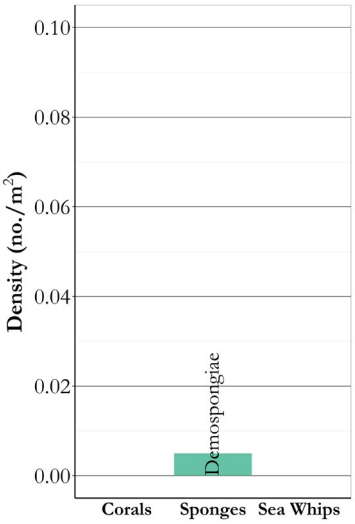
Summary - description of transect

Transect 99: Primary and secondary substrates consisted entirely of sand and mixed coarse. Overall fish and crab density was 0.03 individuals/m^2. Shortspine thornyheads accounted for 47% of the enumerated taxa. The next most abundant taxa were eelpouts and poachers at a combined 36%. Vertical habitat consisted of Demospongiae ($n = 2$) and Hexactinellida ($n = 1$), with a density of 0.01 individuals/m^2. No heights were collected for this transect. No corals were observed.

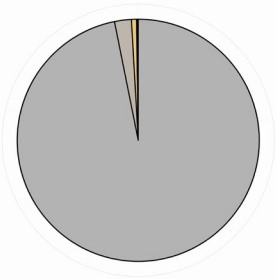
Area: Pribilof Canyon to Zhemchug Canyon					Transect 100
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/19/14	56.16	-170.78	431	148	4.3

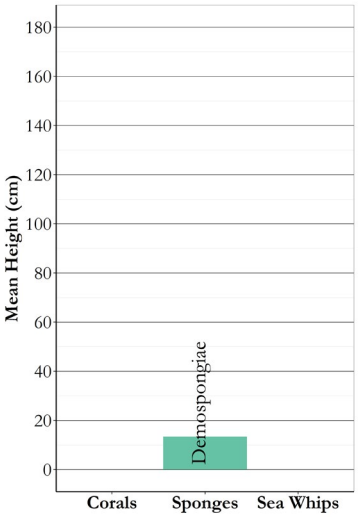
Fish and Crab Composition (n = 20)





Substrate Composition



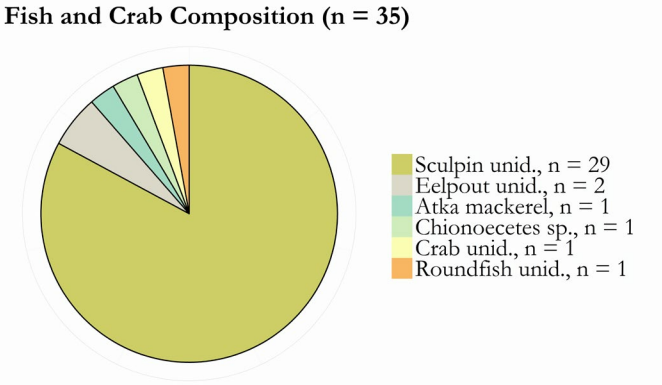


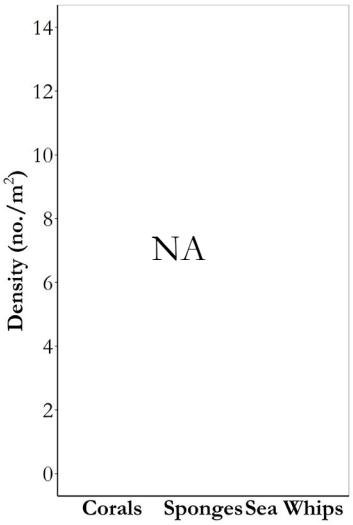
Images

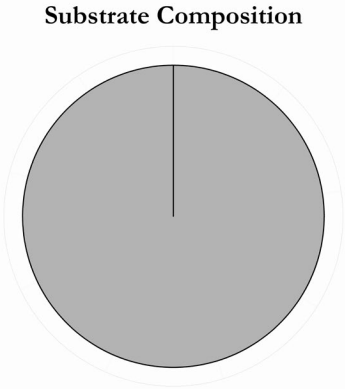
Summary - description of transect

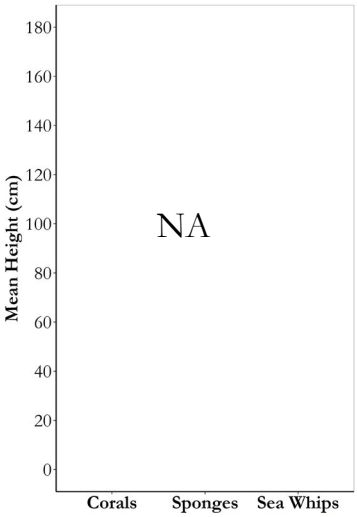
Transect 100: Primary and secondary substrates consisted of sand and mud (97%). The remaining 3% of the substrate was a mixture of sand, mixed coarse, boulder, gravel, and mud. Overall fish and crab density was 0.05 individuals/m^2. Sculpins and harlequin rockfish accounted for 55% of the enumerated taxa. The next most abundant taxa were searchers, unidentified roundfishes, and crabs. Vertical habitat consisted of 2 Demospongiae, with a density of < 0.01 individuals/m^2. One Demospongiae was measured at 13.4 cm. No corals were observed.

Area: Pribilof Canyon to Zhemchug Canyon					Transect 102
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/19/14	56.20	-170.88	491	142	4.3

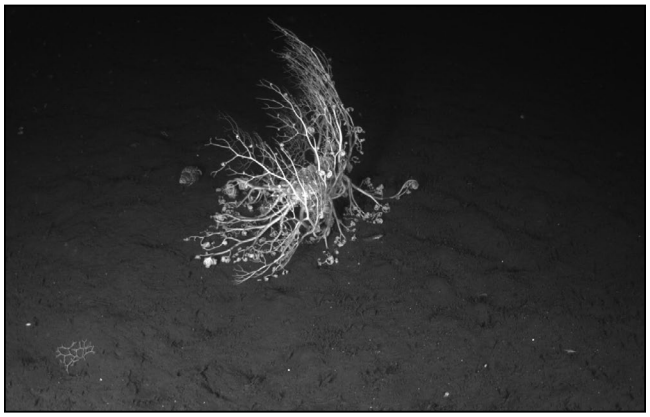








Images

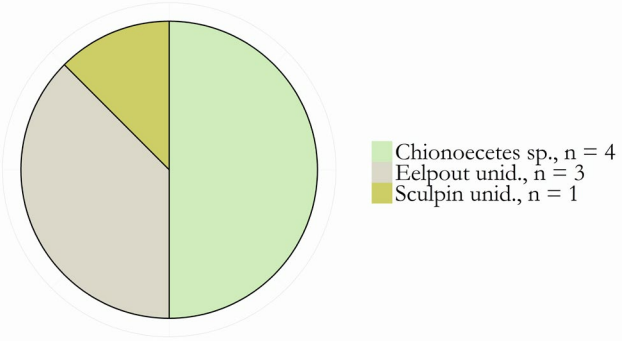


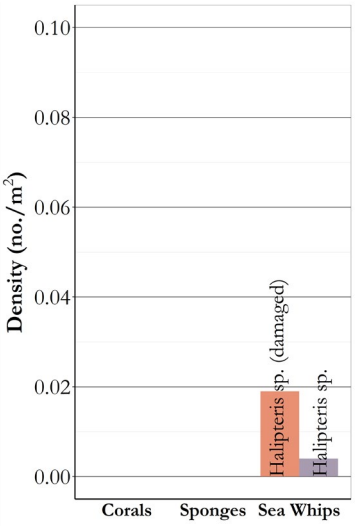
Summary - description of transect

Transect 102: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.07 individuals/m^2. Sculpins accounted for 83% of the enumerated taxa. Eelpouts, unidentified roundfishes, and crabs comprised the remaining 17%. No vertical habitat was identified.

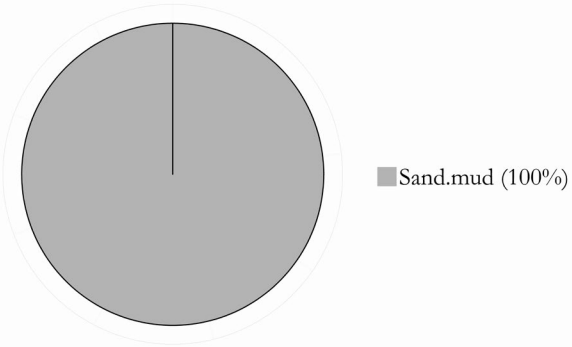
Area: Pribilof Canyon to Zhemchug Canyon					Transect 103
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/19/14	56.24	-170.85	750	132	4.5

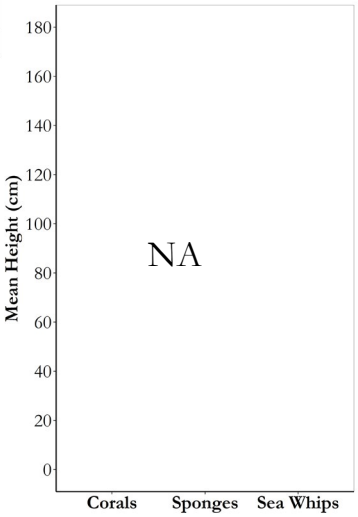
Fish and Crab Composition (n = 8)



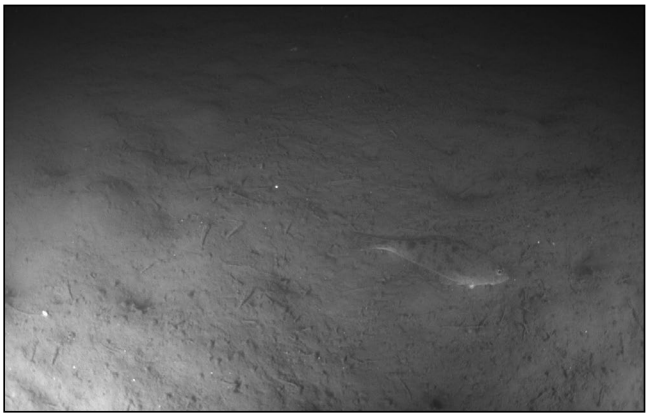


Substrate Composition





Images

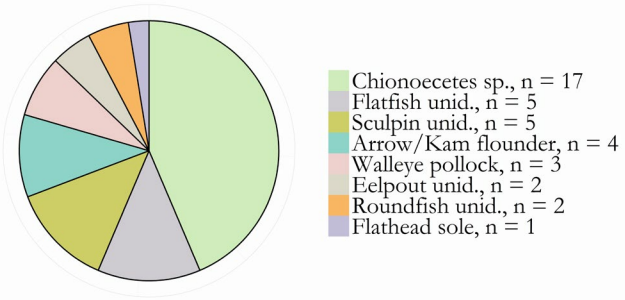


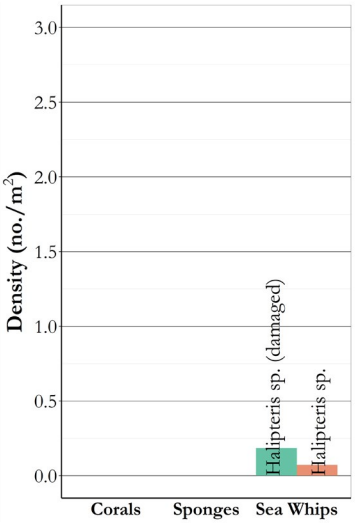
Summary - description of transect

Transect 103: Primary and secondary substrates consisted of sand and mud). Overall fish and crab density was 0.01 individuals/m^2. *Chionoecetes* sp. ($n = 4$) accounted for 50% of the enumerated taxa. Eelpouts and sculpins comprised the remaining 50%. Vertical habitat consisted of 17 sea whips of which 14 were damaged, with a density of 0.02 individuals/m^2. No other corals or sponges were observed.

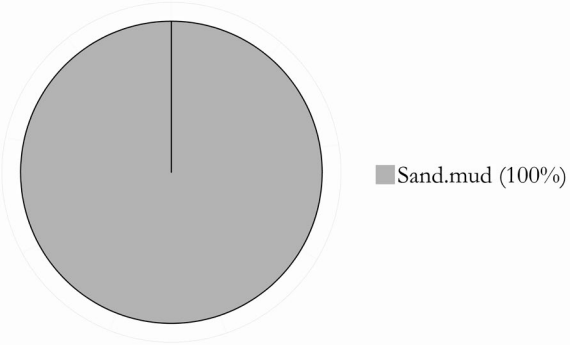
Area: Pribilof Canyon to Zhemchug Canyon					Transect 106
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/20/14	56.28	-170.89	1,145	130	NA

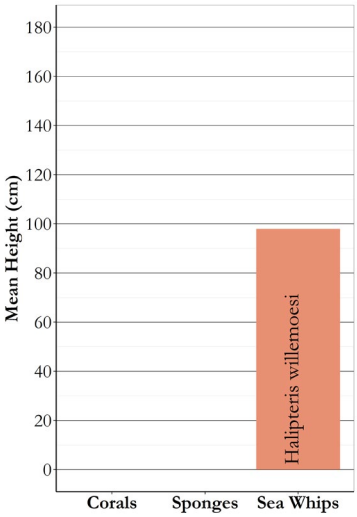
Fish and Crab Composition (n = 39)



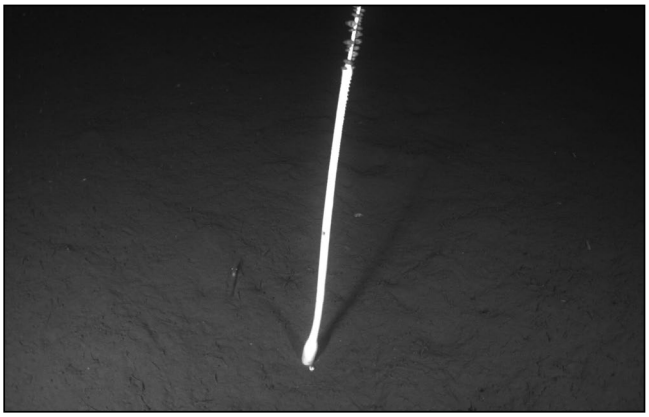


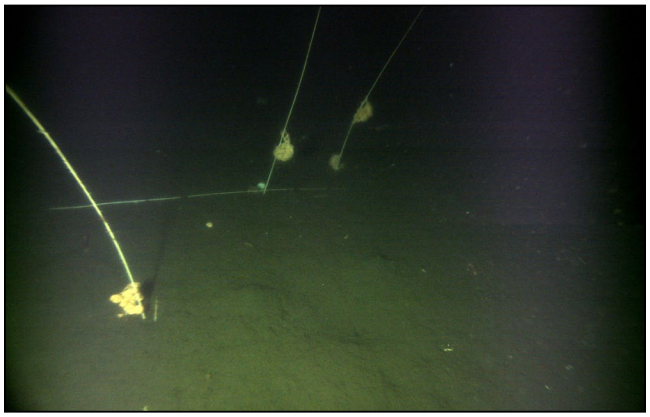
Substrate Composition





Images



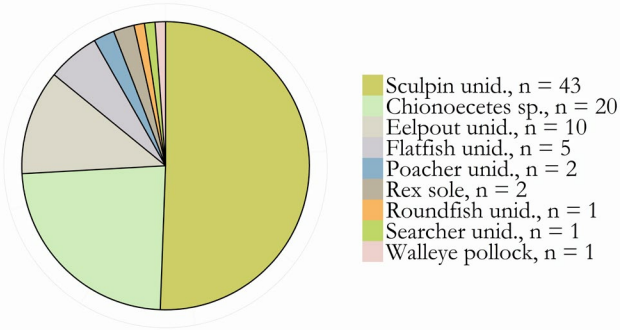


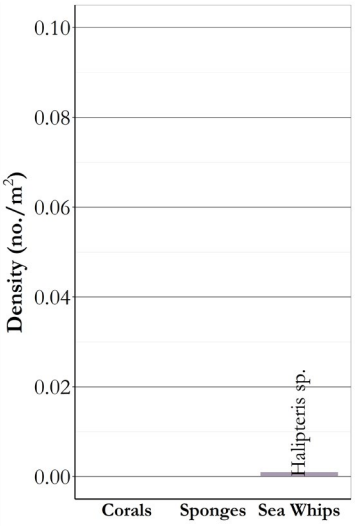
Summary - description of transect

Transect 106: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.03 individuals/m^2. *Chionoecetes* sp. accounted for 44% of the enumerated taxa. The next most abundant taxa were arrowtooth/Kamchatka flounder, sculpins and flatfishes, comprising 36% of the remaining observations. Vertical habitat consisted of 295 (212 damaged) sea whips, with a density of 0.27 individuals/m^2. Sea whip heights (n = 8) ranged from 45.9 cm to 118.1 cm with a mean of 97.9 cm. No other corals or sponges were observed.

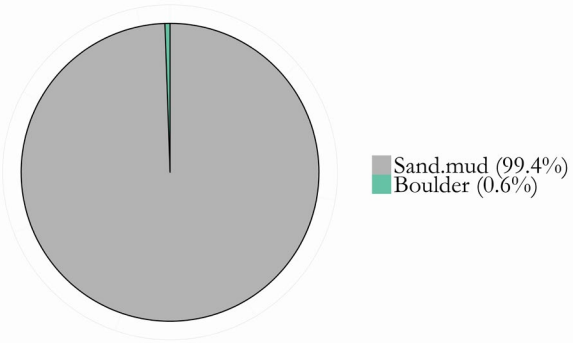
Area: Pribilof Canyon to Zhemchug Canyon					Transect 107
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/20/14	56.26	-170.96	714	137	4.4

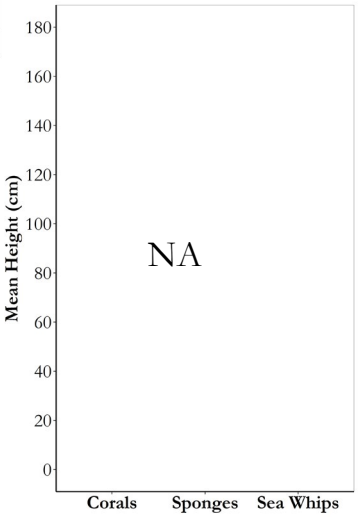
Fish and Crab Composition (n = 85)





Substrate Composition





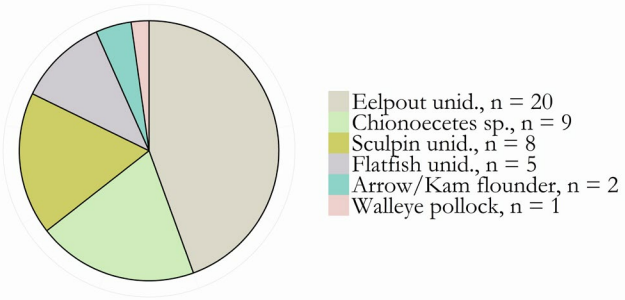
Images

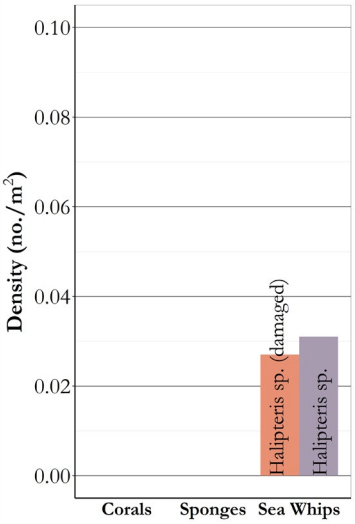
Summary - description of transect

Transect 107: Primary and secondary substrates consisted of sand and mud (99%) and a boulder (1%). Overall fish and crab density was 0.12 individuals/m^2. Sculpins, *Chionoecetes* sp., and eelpouts accounted for 86% of the enumerated taxa. Vertical habitat consisted of 1 sea whip that was not measured. No other corals or sponges were observed.

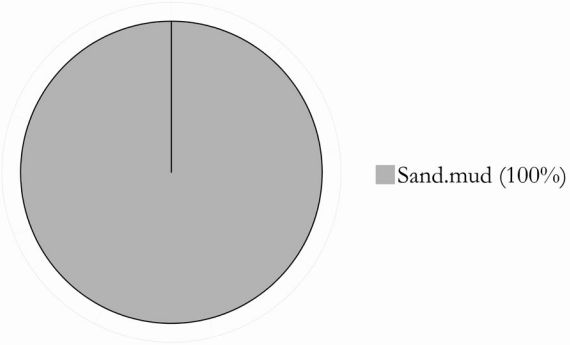
Area: Pribilof Canyon to Zhemchug Canyon					Transect 108
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/20/14	56.29	-171.00	1,193	131	4.4

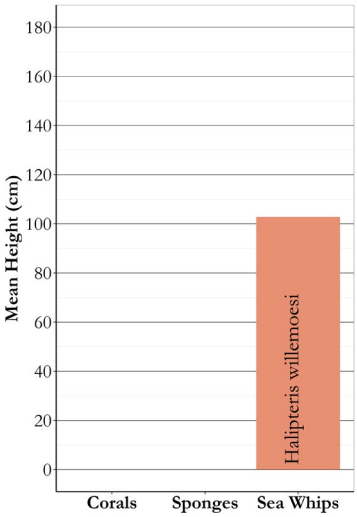
Fish and Crab Composition (n = 45)



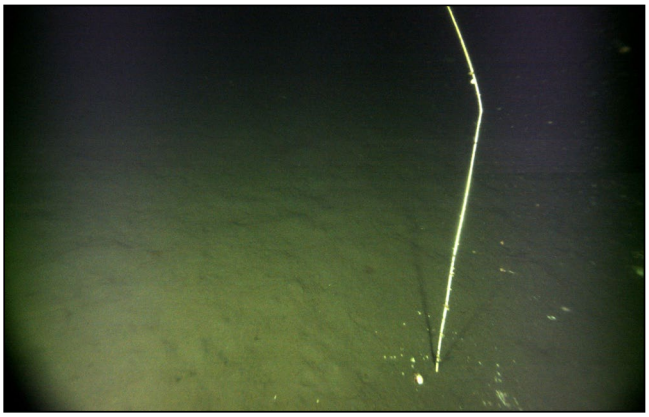


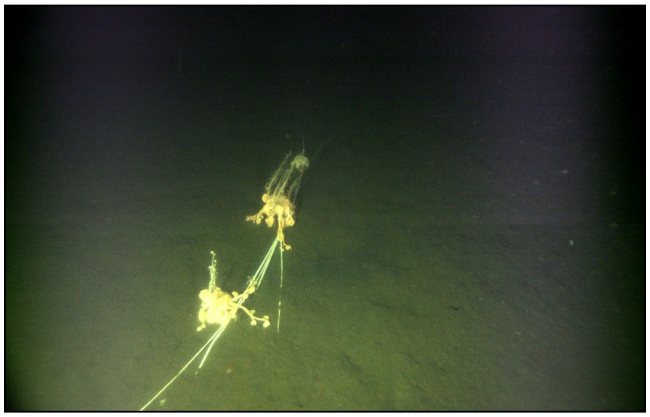
Substrate Composition





Images



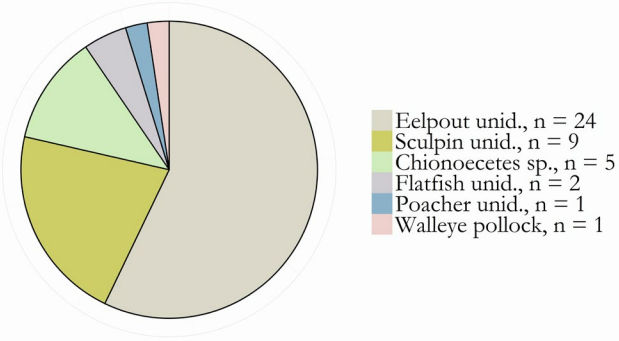


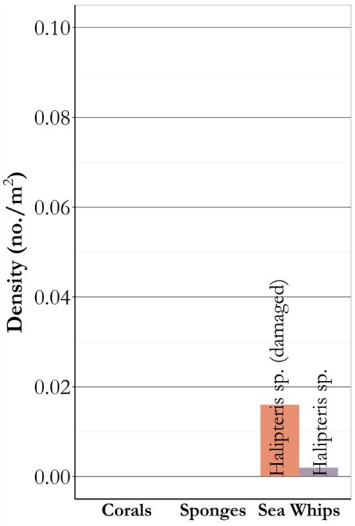
Summary - description of transect

Transect 108: Primary and secondary substrates consisted of sand and mud. Overall fish and crab density was 0.04 individuals/m^2. Eelpouts accounted for 44% of the enumerated taxa. Sculpins, *Chionoecetes* sp., and flatfishes accounted for 49% of the taxa. Vertical habitat consisted of 69 sea whips (32 damaged), with a density of 0.06 individuals/m^2. Sea whip heights ($n = 3$) ranged from 90.4 cm to 112.9 cm, with a mean of 102.8 cm. No other corals or sponges were observed.

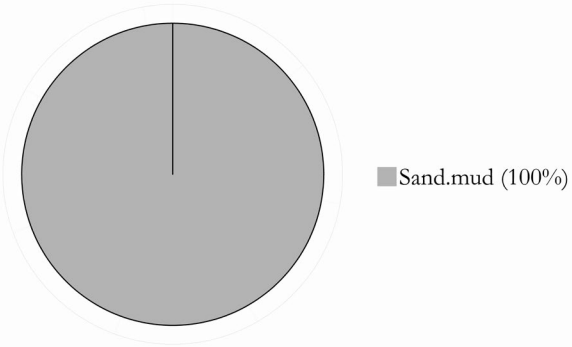
Area: Pribilof Canyon to Zhemchug Canyon					Transect 111
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/20/14	56.29	-171.10	451	134	4.3

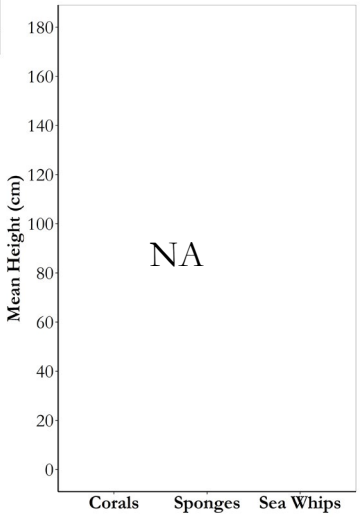
Fish and Crab Composition (n = 42)



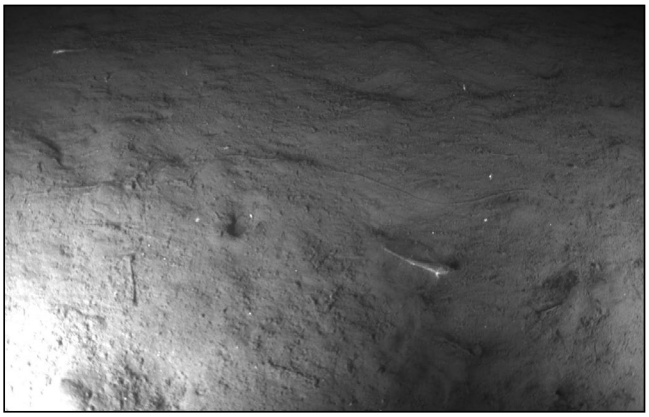


Substrate Composition





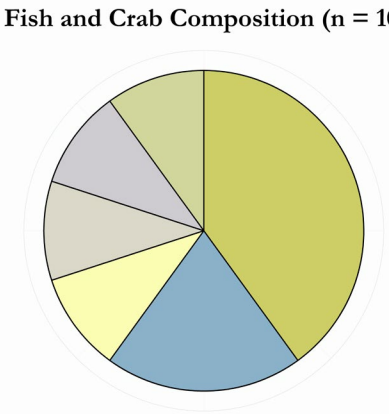
Images

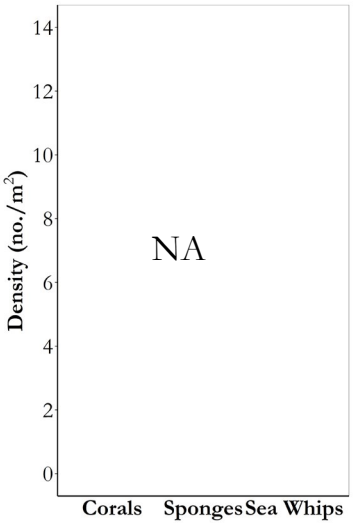


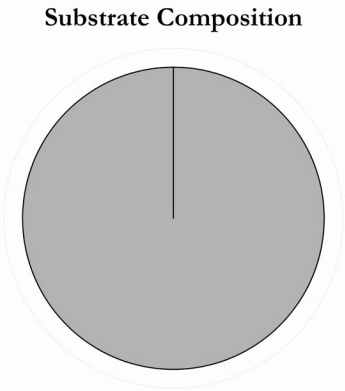
Summary - description of transect

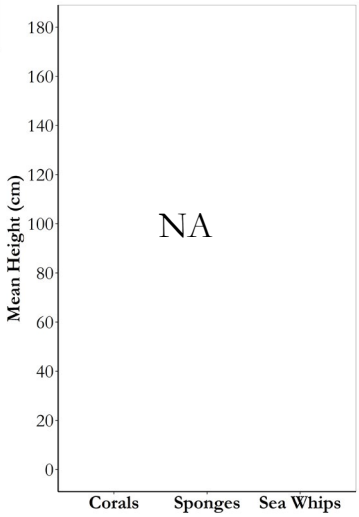
Transect 111: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.09 individuals/m^2. Eelpouts accounted for 57% of the enumerated taxa. The next most abundant taxa were sculpins (21%) and *Chionoecetes* sp. (12%). Vertical habitat consisted of 8 sea whips (7 damaged), with a density of 0.02 individuals/m^2. No height measurements were recorded. No other corals or sponges were observed.

Area: Pribilof Canyon to Zhemchug Canyon					Transect 112
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/20/14	56.27	-171.13	204	138	4.3









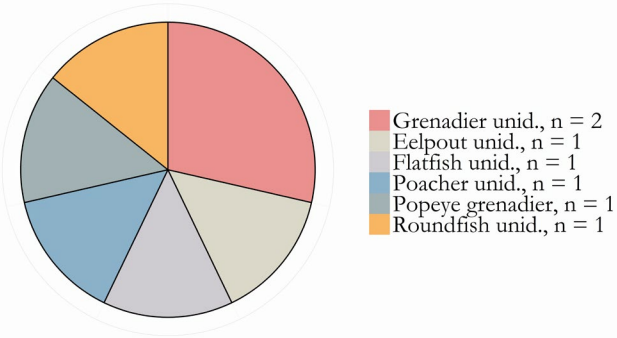
Images

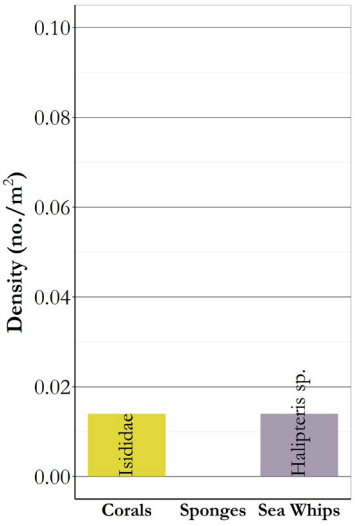
Summary - description of transect

Transect 112: Primary and secondary substrates entirely of sand and mud. Overall fish and crab density was 0.05 individuals/m^2. Sculpins accounted for 40% of the enumerated taxa. The next most abundant taxa were poachers at 20%. No vertical habitat was identified.

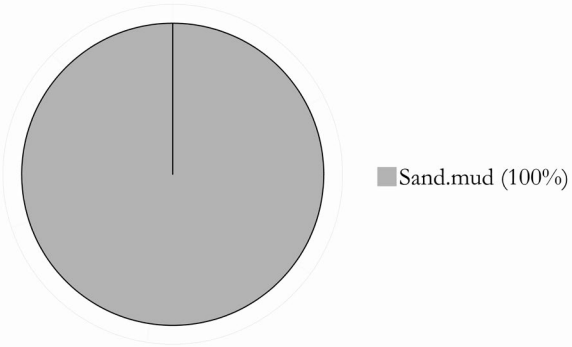
Area: Pribilof Canyon to Zhemchug Canyon					Transect 113
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/20/14	56.23	-171.31	214	726	3.4

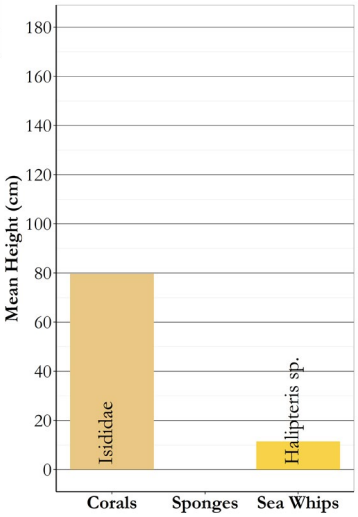
Fish and Crab Composition (n = 7)





Substrate Composition





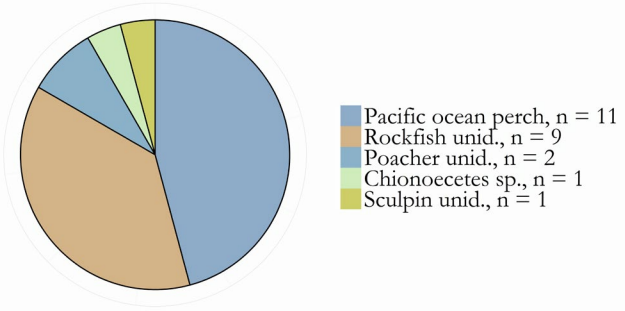
Images

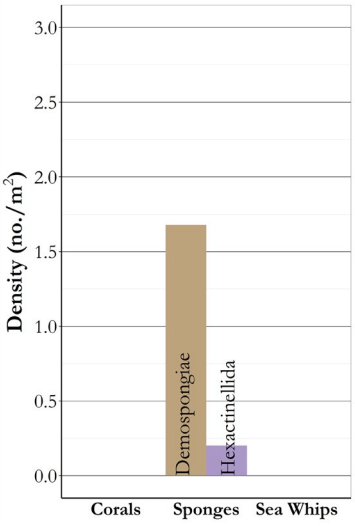
Summary - description of transect

Transect 113: Primary and secondary substrates consisted of sand and mud. Overall fish and crab density was 0.03 individuals/m^2. Species composition was evenly distributed between all of the taxa. Vertical habitat consisted of sea whips and Isididae, with a density of 0.03 individuals/m^2. Only 1 sea whip was measured at 11.43 cm. Two Isididae were measured at 59.9 cm and 101.4. No sponges were observed.

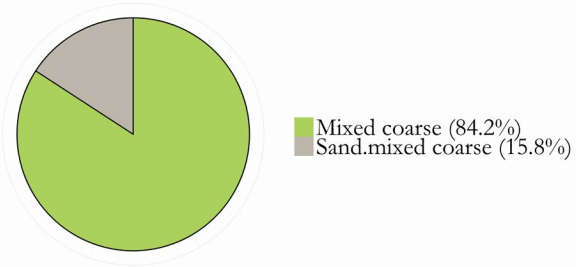
Area: Pribilof Canyon to Zhemchug Canyon					Transect 114
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/20/14	56.26	-171.33	1,918	238	3.9

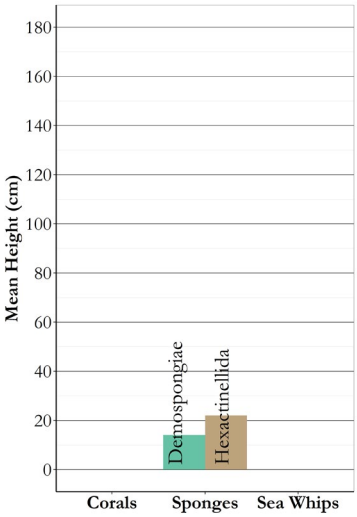
Fish and Crab Composition (n = 24)





Substrate Composition





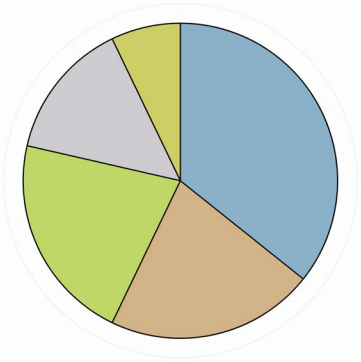
Images

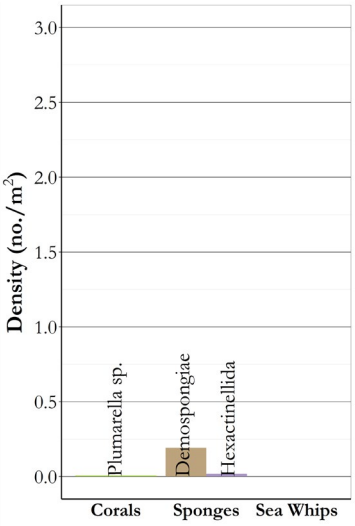
Summary - description of transect

Transect 114: Primary and secondary substrates consisted of mixed coarse (86%) and sand with mixed coarse (16%). Overall fish and crab density was 0.01 individuals/m^2. Pacific ocean perch and rockfishes accounted for 84% of the enumerated taxa. Poachers, *Chionoecetes* sp., and sculpins accounted for the remaining 16% of the observations. Vertical habitat consisted of Demospongiae (n = 3,220) and Hexactinellida (n = 388), with a density of 1.88 individuals/m^2. Demospongiae heights (n = 58) ranged from 10.1 cm to 24.2 cm with a mean of 14.1 cm. Hexactinellida heights (n = 85) ranged from 10.3 cm to 62.1 cm, with a mean of 22.0 cm. No corals were observed.

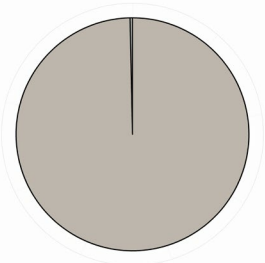
Area: Pribilof Canyon to Zhemchug Canyon					Transect 115
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/20/14	56.40	-171.37	1,549	210	4.1

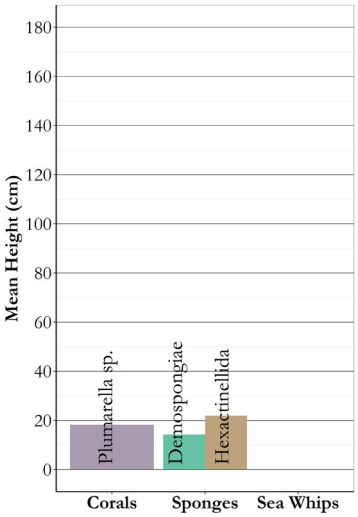
Fish and Crab Composition (n = 14)





Substrate Composition





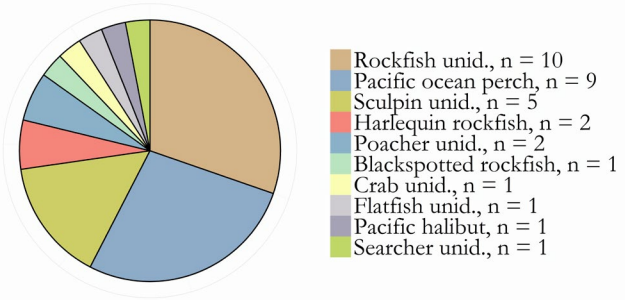
Images

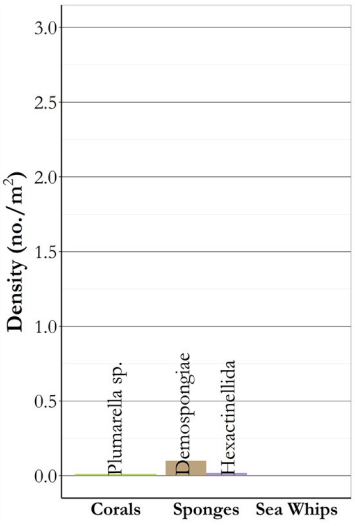
Summary - description of transect

Transect 115: Primary and secondary substrates consisted of sand and mixed coarse (99%) and sand with mud (< 1%). Overall fish and crab density was very low with only 0.01 individuals/m^2. Poachers, rockfishes, and searchers were the most abundant accounting for 78% of the enumerated taxa. Vertical habitat consisted of *Plumarella* sp. ($n = 11$), Demospongiae ($n = 297$), and Hexactinellida ($n = 30$), with a density of 0.22 individuals/m^2. Demospongiae heights ($n = 28$) ranged from 10.2 cm to 22.9 cm with a mean of 14.3 cm. Hexactinellida heights ($n = 4$) ranged from 15.2 cm to 29.1 cm, with a mean of 21.9 cm. *Plumarella* sp. ($n = 2$) ranged from 12.0 cm to 24.6 cm, with a mean of 18.3 cm. No sea whips were observed.

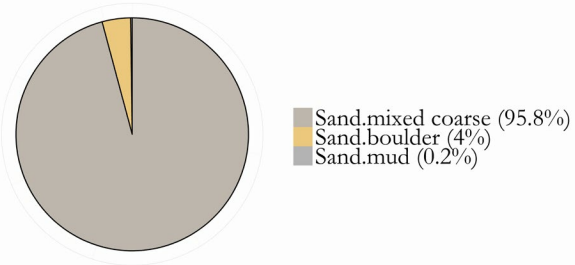
Area: Pribilof Canyon to Zhemchug Canyon					Transect 116
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/20/14	56.42	-171.38	1,957	207	4.1

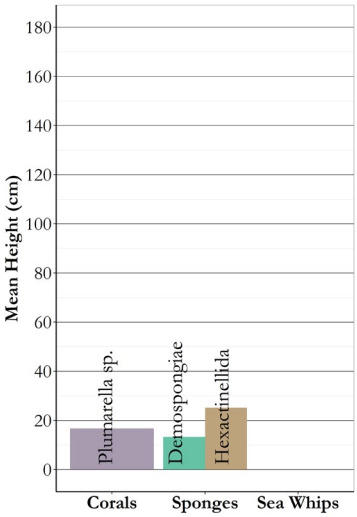
Fish and Crab Composition (n = 33)



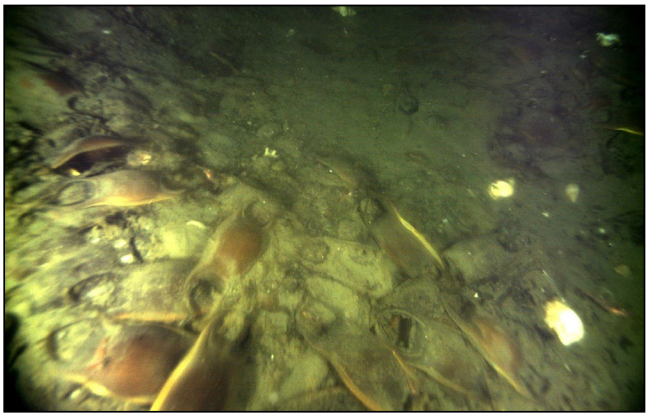


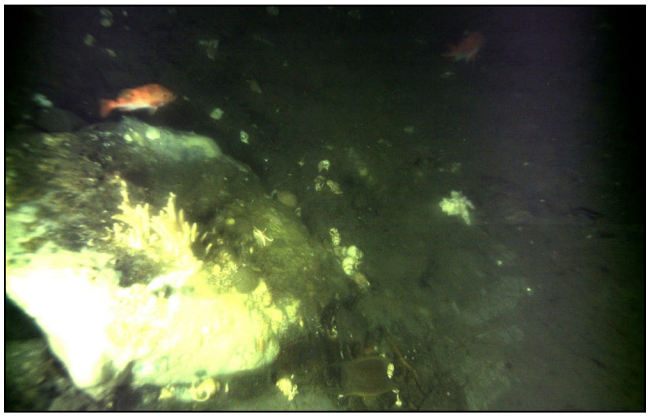
Substrate Composition





Images



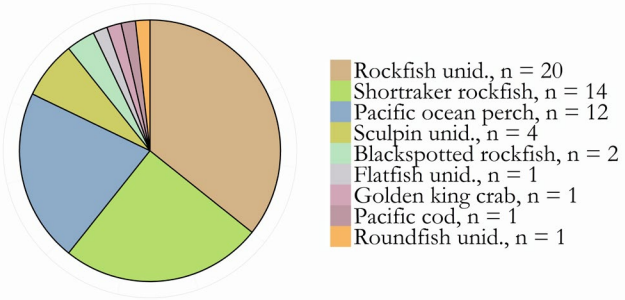


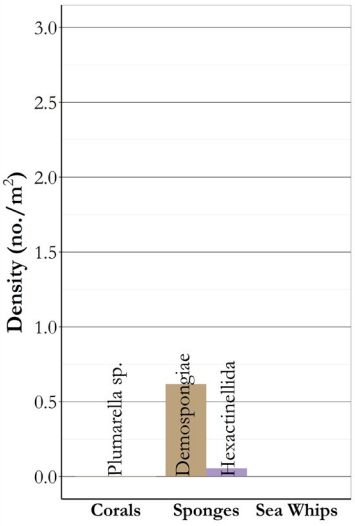
Summary - description of transect

Transect 116: Primary and secondary substrates consisted of sand and mixed coarse (96%). The remaining 4% consisted of sand, boulders, and mud. Overall fish and crab density was 0.02 individuals/m^2. Rockfishes (30%), Pacific ocean perch (27%), and sculpins (15%) accounted for 73% of the enumerated taxa. Vertical habitat consisted of Demospongiae ($n = 196$), Hexactinellida (38), and *Plumarella* sp. ($n = 22$), with a density of 0.13 individuals/m^2. Demospongiae heights ($n = 29$) ranged from 10.2 cm to 25.0 cm with a mean of 13.3 cm. Hexactinellida heights ($n = 9$) ranged from 14.7 cm to 48.2 cm, with a mean of 25.2 cm. *Plumarella* sp. ($n = 10$) ranged from 6.7 cm to 42.6 cm, with a mean of 16.7 cm. A large number of skate egg cases were observed but not counted. No sea whips were observed.

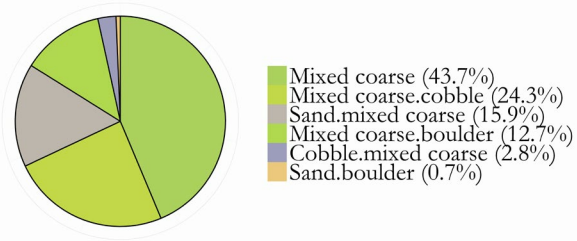
Area: Pribilof Canyon to Zhemchug Canyon					Transect 117
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/20/14	56.47	-171.49	1,519	285	3.9

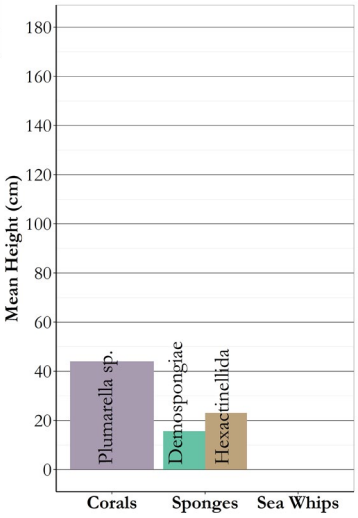
Fish and Crab Composition (n = 56)



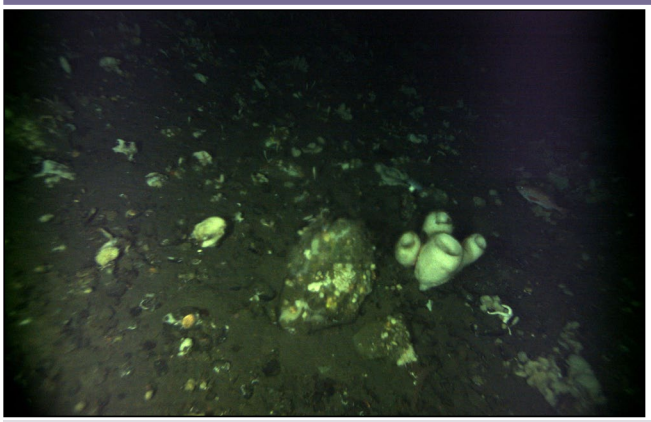


Substrate Composition





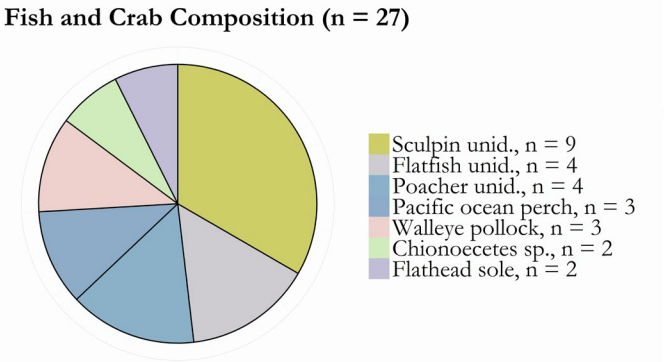
Images

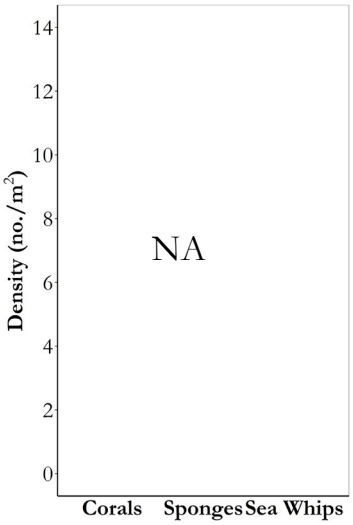


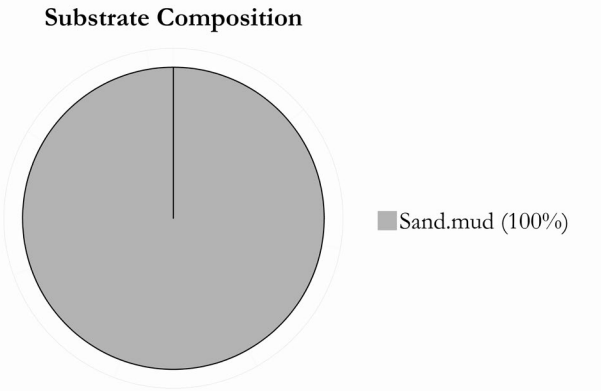
Summary - description of transect

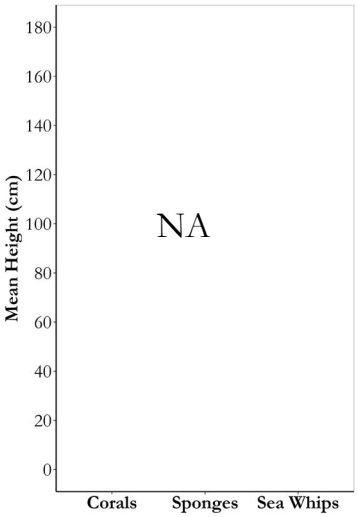
Transect 117: Substrates for Transect 117 were more diverse than most transects in the area. Primary substrates were mostly mixed coarse and sand. Secondary substrates consisted of mixed coarse, boulders, and cobble. Overall fish and crab density was 0.04 individuals/m^2. Other rockfishes ($n = 20$) accounted for 36% of the enumerated taxa. The next most abundant taxa were shortraker rockfish (25%) and Pacific ocean perch (21%). Vertical habitat consisted of Demospongiae ($n = 939$), Hexactinellida ($n = 85$), and *Plumarella* sp. ($n = 2$), with a total density of 0.68 individuals/m^2. Demospongiae heights ($n = 128$) ranged from 10.1 cm to 34.1 cm with a mean of 15.7 cm. Hexactinellida heights ($n = 17$) ranged from 10.9 cm to 43.7 cm, with a mean of 23.1 cm. One *Plumarella* sp. ($n = 1$) was measured at 44.4 cm. No sea whips were observed.

Area: Pribilof Canyon to Zhemchug Canyon					Transect 118
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/20/14	56.47	-171.74	806	281	3.9

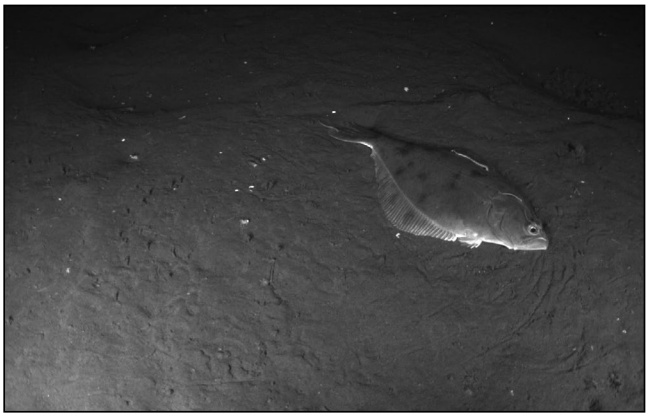








Images

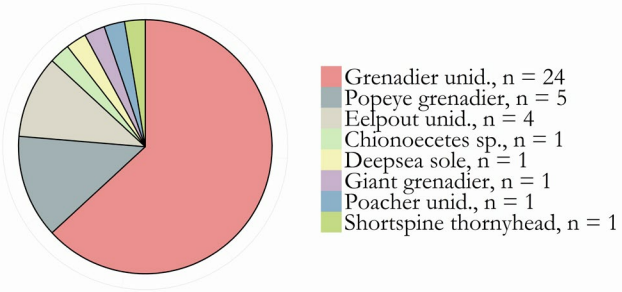


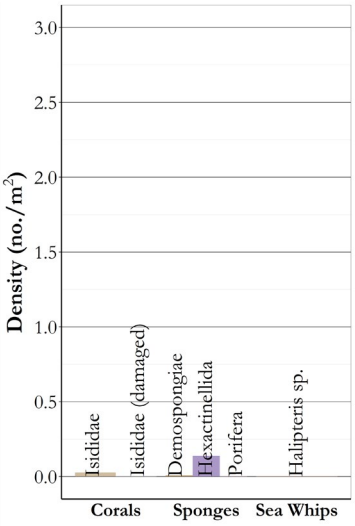
Summary - description of transect

Transect 118: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.03 individuals/m^2. Sculpins accounted for 33% of the enumerated taxa. The next most abundant taxa were flatfishes and poachers at 15% respectively, and walleye pollock and Pacific ocean perch at 11% respectively. No vertical habitat was identified.

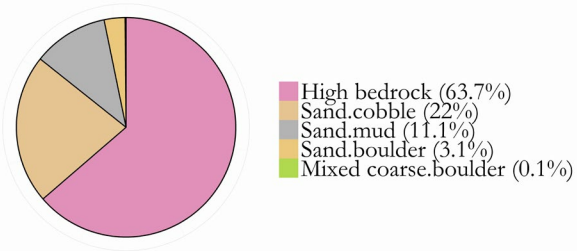
Area: Pribilof Canyon to Zhemchug Canyon					Transect 119
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/20/14	56.45	-171.85	1,235	760	3.3

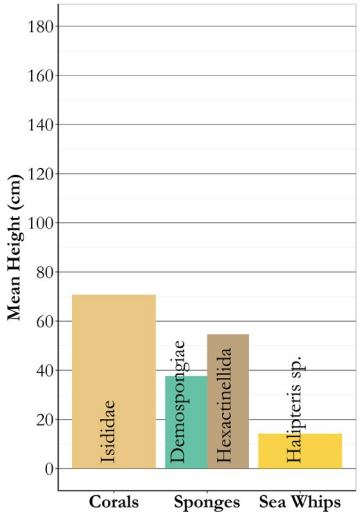
Fish and Crab Composition (n = 38)



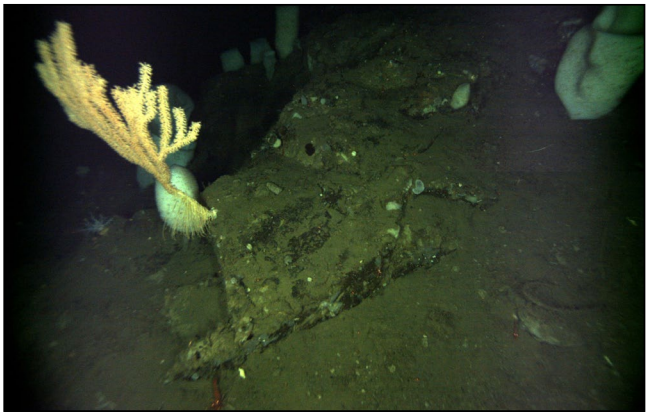


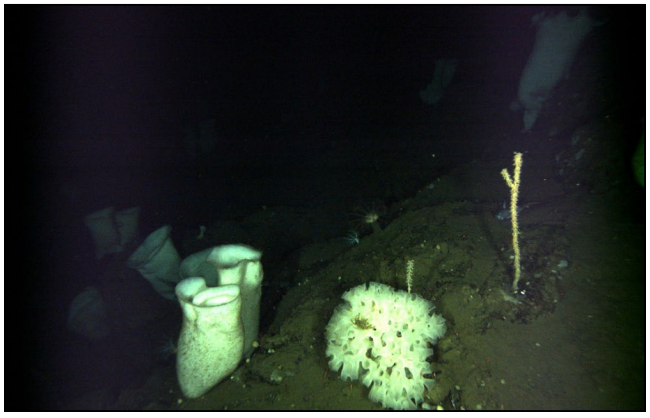
Substrate Composition





Images

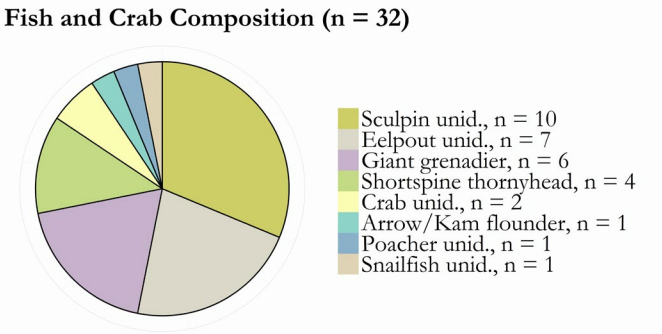


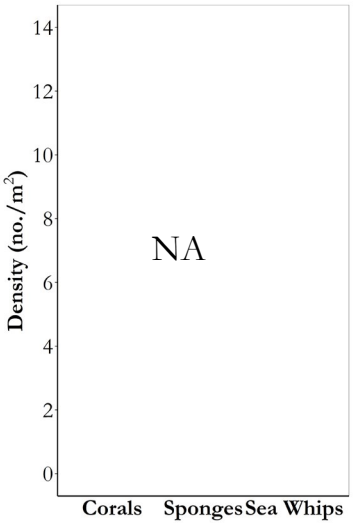


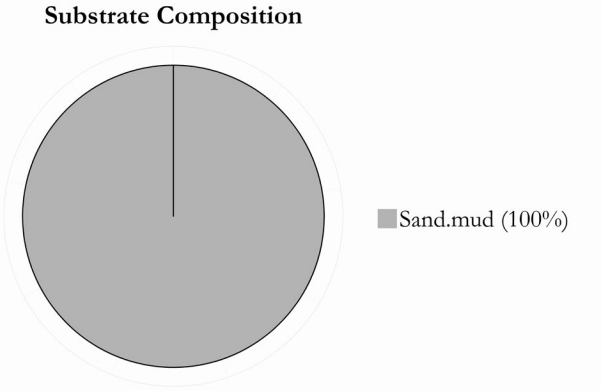
Summary - description of transect

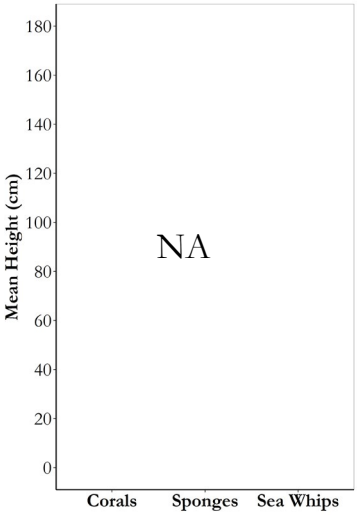
Transect 119: Primary and secondary substrates consisted of high bedrock (64%) for more than half of the transect, and sand with boulders, cobble, and mud for the remainder. Overall fish and crab density was 0.03 individuals/m^2. Sculpins accounted for 33% of the enumerated taxa. Flatfishes, poachers, Pacific ocean perch, and walleye pollock accounted for 52% of the remaining observations. Vertical habitat consisted of Isididae, sea whips, Demospongiae, Hexactinellida, and other sponges, with a density of 0.18 individuals/m^2. Demospongiae heights ($n = 3$) ranged from 13.7 cm to 85.3 cm with a mean of 37.6 cm. Hexactinellida heights ($n = 43$) ranged from 10.8 cm to 161.5 cm, with a mean of 54.6 cm. Isididae ($n = 11$) ranged from 31.0 cm to 116.2 cm, with a mean of 70.8 cm. *Halipteris* sp. ($n = 2$) heights ranged from 13.0 cm to 15.4 cm, with a mean of 14.2 cm.

Area: Pribilof Canyon to Zhemchug Canyon					Transect 120
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/21/14	56.54	-172.12	1,000	537	3.7

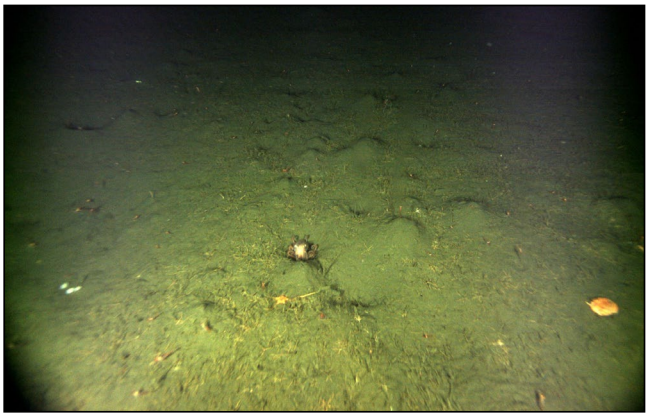








Images

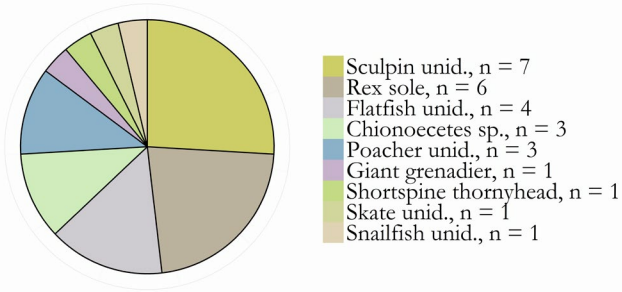


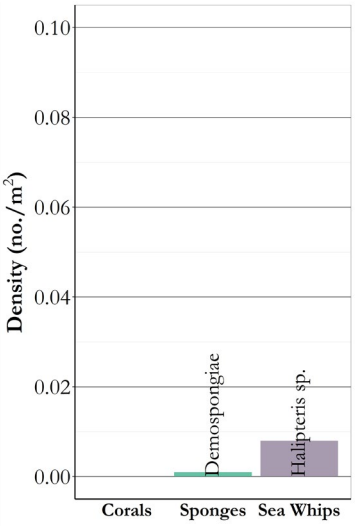
Summary - description of transect

Transect 120: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.03 individuals/m^2. Sculpins accounted for 31% of the enumerated taxa. The next most abundant taxa were eelpouts (22%) and giant grenadiers (19%). No vertical habitat was identified.

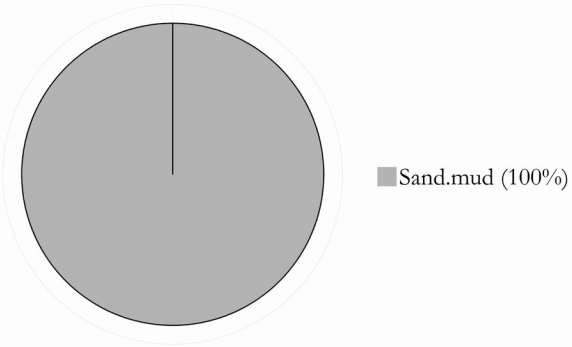
Area: Pribilof Canyon to Zhemchug Canyon					Transect 121
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/21/14	56.58	-172.24	1,308	370	3.9

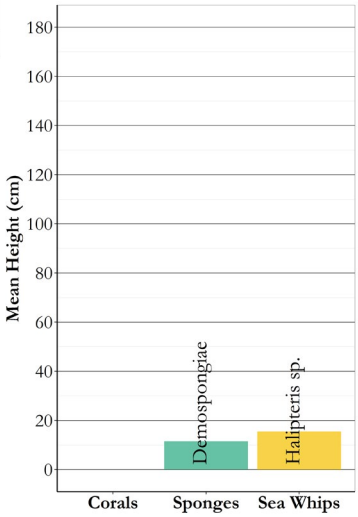
Fish and Crab Composition (n = 27)





Substrate Composition





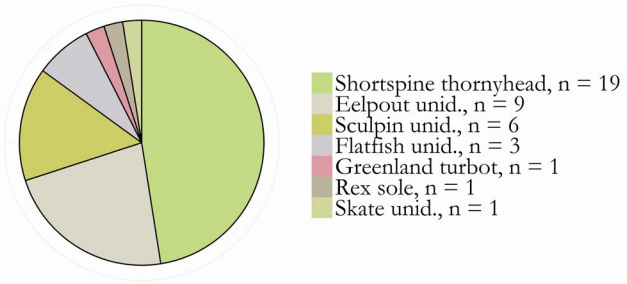
Images

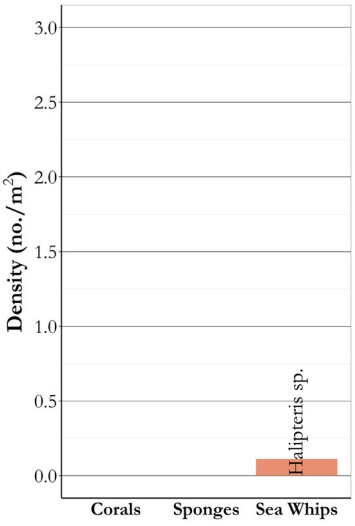
Summary - description of transect

Transect 121: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.02 individuals/m^2. Species composition was not dominated by any one taxon. Sculpins (26%), rex sole (22%), flatfishes (15%), poachers (11%), and *Chionoecetes* sp. (11%) comprised 85% of the taxa observed. Vertical habitat consisted of sea whips ($n = 11$) and Demospongiae ($n = 1$), with a density of 0.01 individuals/m^2. One Demospongiae measured was at 11.5 cm. Sea whip heights ($n = 7$) ranged from 9.5 cm to 22.6 cm, with a mean of 16.4 cm. No other corals were observed.

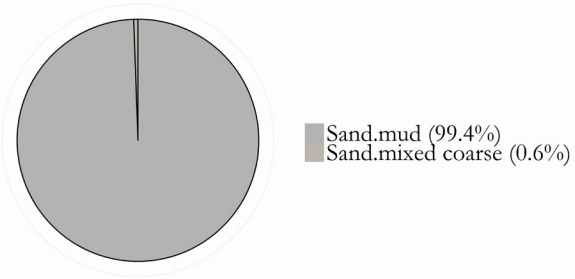
Area: Pribilof Canyon to Zhemchug Canyon					Transect 122
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/21/14	56.59	-172.36	982	434	3.8

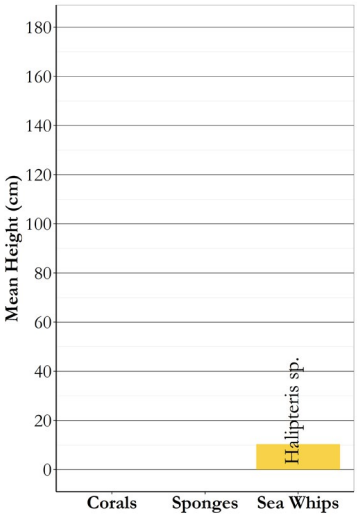
Fish and Crab Composition (n = 40)





Substrate Composition





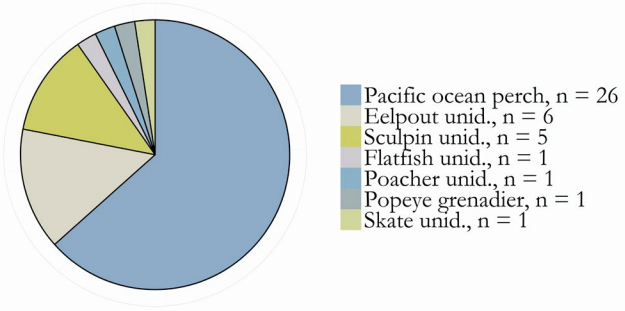
Images

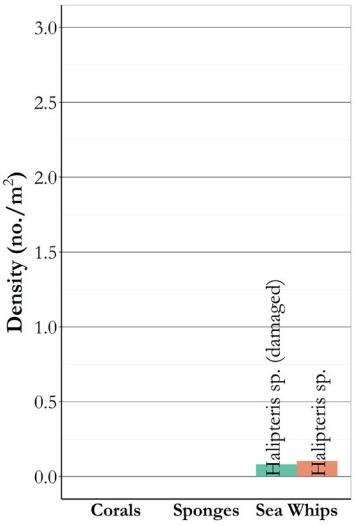
Summary - description of transect

Transect 122: Primary and secondary substrates were 99% sand and mud and 1% sand and mixed coarse. Overall fish and crab density was 0.04 individuals/m^2. Shortspine thornyheads accounted for 48% of the enumerated taxa. The next most abundant taxa were eelpouts (23%) and sculpins (15%). Vertical habitat consisted of sea whips ($n = 110$), with a density of 0.11 individuals/m^2. *Halipteris* sp. heights ($n = 36$) ranged from 6.3 cm to 21.8 cm with a mean of 10.3 cm. No other corals or sponges were observed.

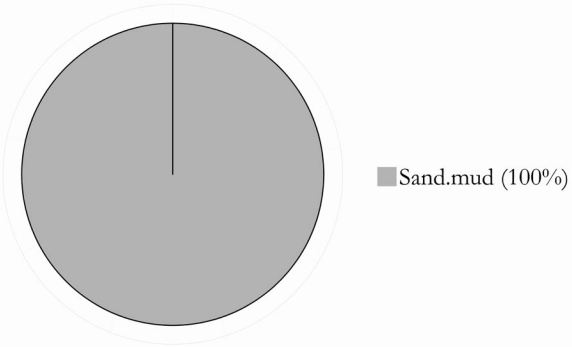
Area: Pribilof Canyon to Zhemchug Canyon					Transect 123
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/21/14	56.65	-172.43	2,124	139	4.3

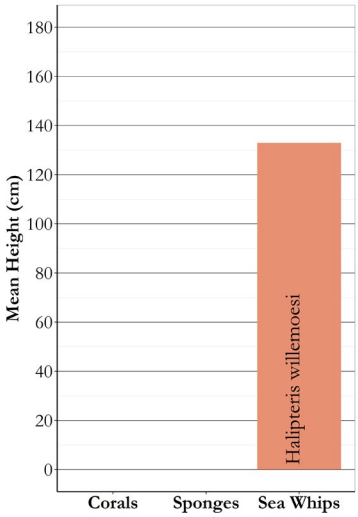
Fish and Crab Composition (n = 41)



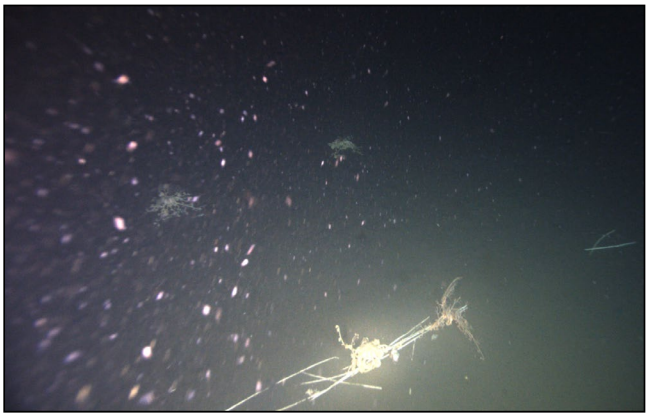


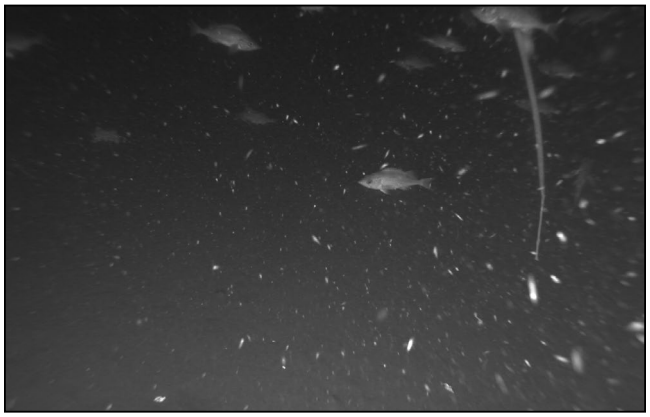
Substrate Composition





Images



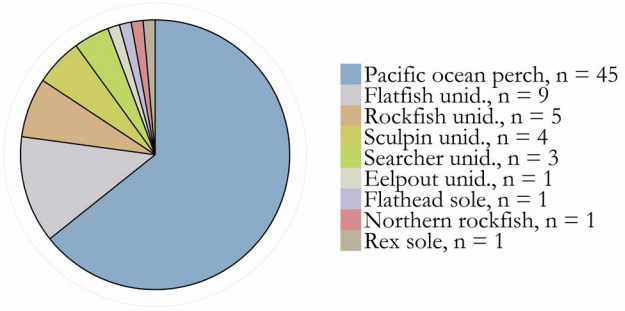


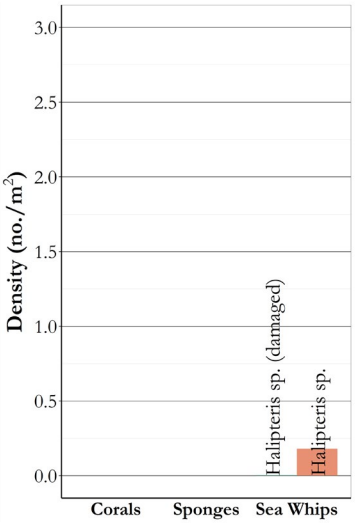
Summary - description of transect

Transect 123: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.02 individuals/m^2. Pacific ocean perch accounted for 63% of the enumerated taxa. The next most abundant taxa were eelpouts (15%) and sculpins (12%). Vertical habitat consisted of 397 sea whips (175 damaged), with a density of 0.19 individuals/m^2. Sea whip heights (n = 13) ranged from 104.3 cm to 157.2 cm with a mean of 132.9 cm. No other corals or sponges were observed.

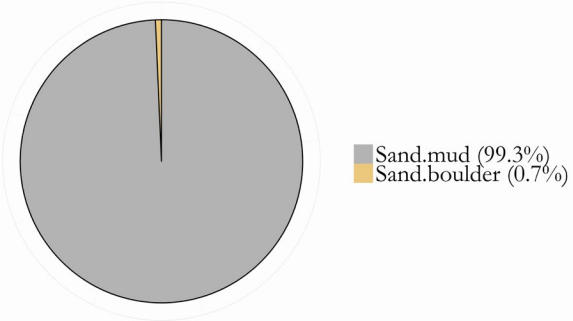
Area: Pribilof Canyon to Zhemchug Canyon					Transect 124
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/21/14	56.59	-172.52	2,201	214	4.0

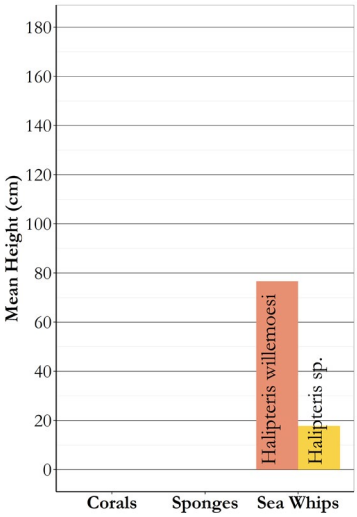
Fish and Crab Composition (n = 70)



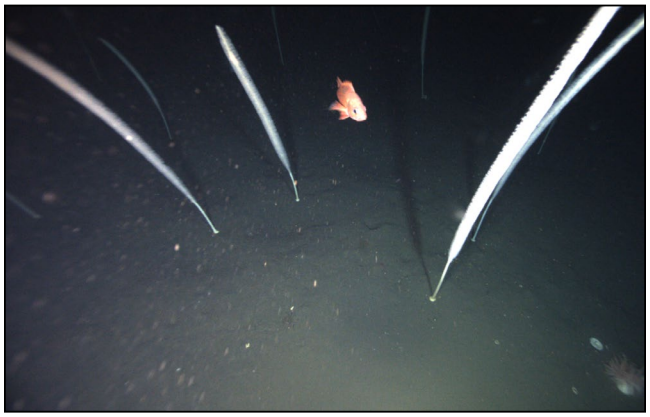


Substrate Composition





Images

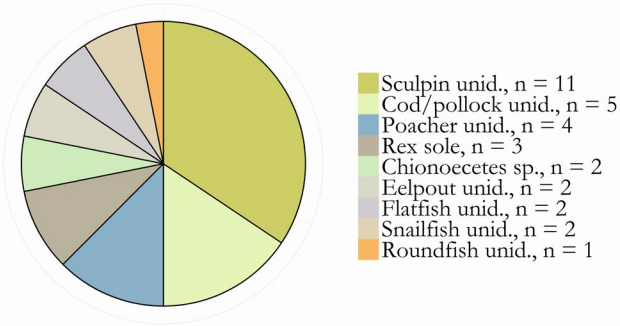


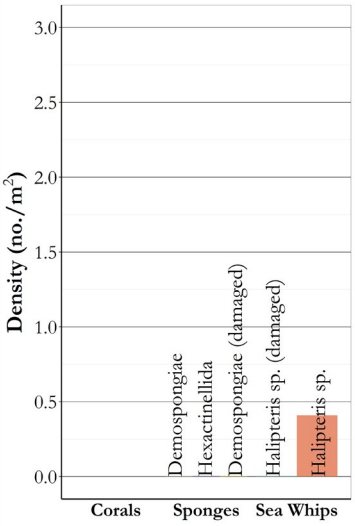
Summary - description of transect

Transect 124: Primary and secondary substrates consisted of sand and mud (99%) and sand and boulder (1%). Overall fish and crab density was 0.03 individuals/m^2. Pacific ocean perch ($n = 45$) accounted for 64% of the enumerated taxa. The next most abundant taxa were flatfishes at 13%. Vertical habitat consisted of 407 sea whips (10 damaged), with a density of 0.19 individuals/m^2. *Halipteris* sp. ($n = 9$) heights ranged from 3.8 cm to 32.1 cm with a mean of 17.8 cm. *Halipteris willemoesi* ($n = 90$) heights ranged from 8.9 cm to 151.8 cm, with a mean of 76.6 cm. No other corals were observed.

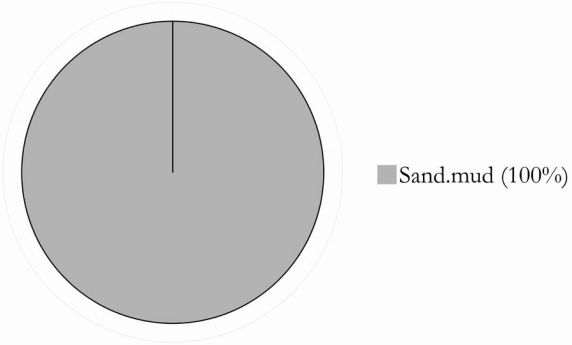
Area: Pribilof Canyon to Zhemchug Canyon					Transect 125
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/21/14	56.51	-172.72	1,337	356	3.9

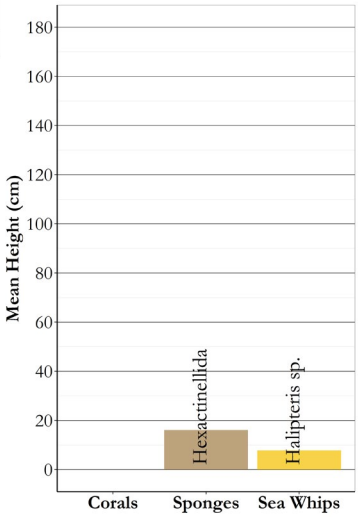
Fish and Crab Composition (n = 32)





Substrate Composition



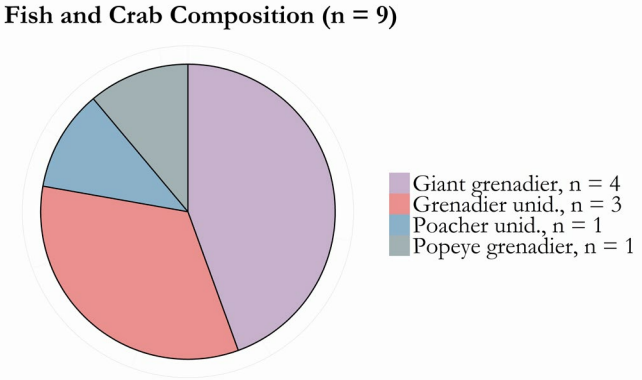


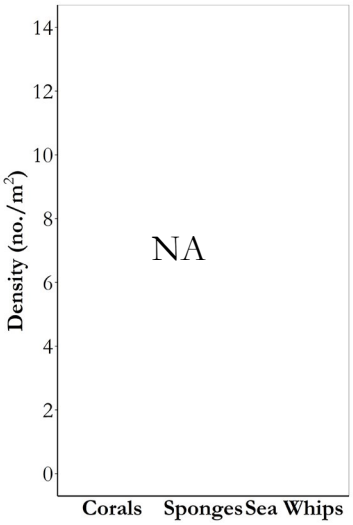
Images

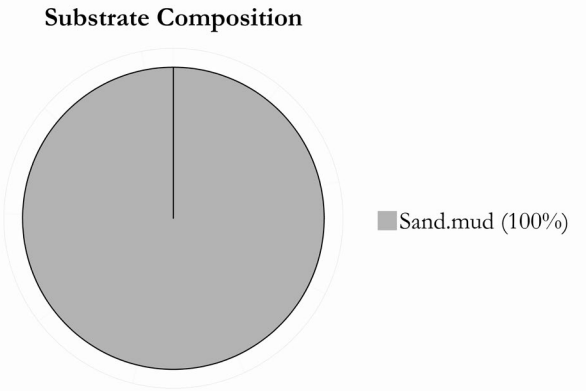
Summary - description of transect

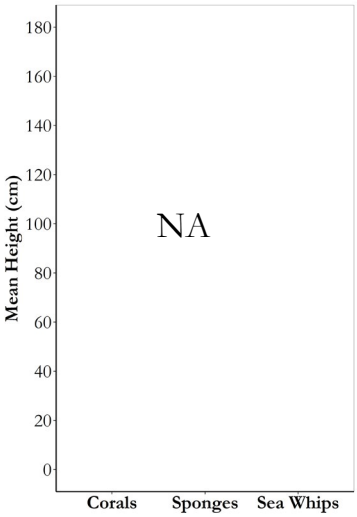
Transect 125: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.02 individuals/m^2. Sculpins accounted for 34% of the enumerated taxa. The next most abundant taxa were *Gadus* sp. and poachers for a combined abundance of 29%. Vertical habitat consisted of 548 sea whips (5 damaged), Demospongiae ($n = 7$), and Hexactinellida ($n = 7$), with a density of 0.42 individuals/m^2. *Halipteris* sp. heights ($n = 36$) ranged from 4.1 cm to 13.8 cm with a mean of 7.8 cm. Hexactinellida heights ($n = 2$) ranged from 12.8 cm to 19.4 cm, with a mean of 16.1 cm. No other corals were observed.

Area: Pribilof Canyon to Zhemchug Canyon					Transect 126
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/21/14	56.45	-172.72	474	757	3.2

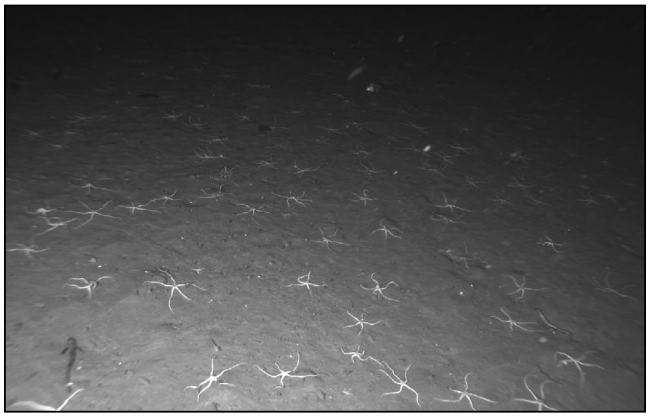








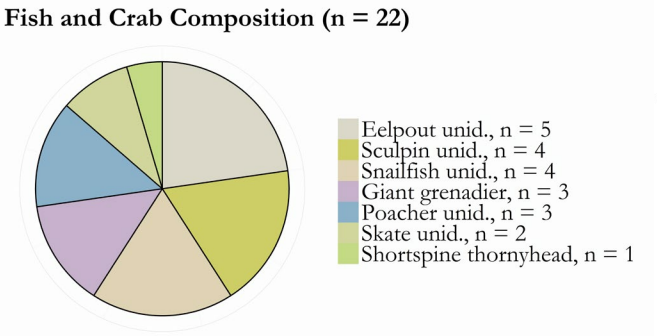
Images

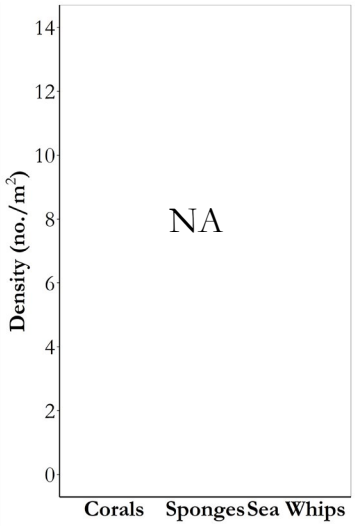


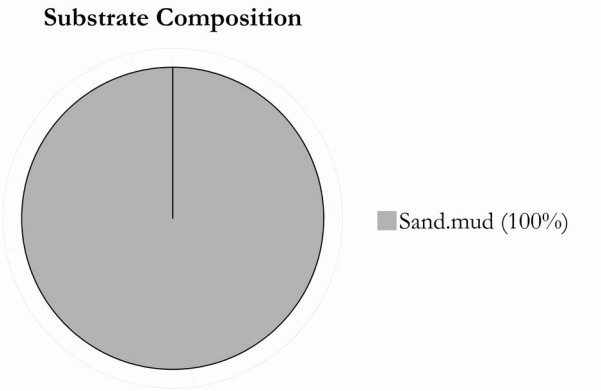
Summary - description of transect

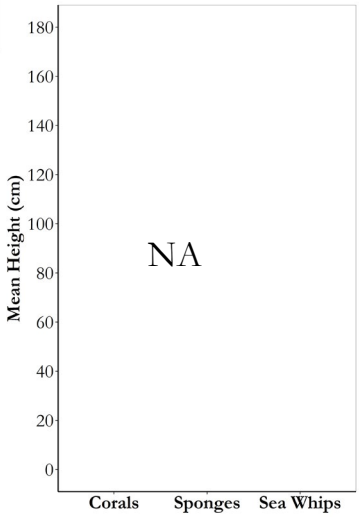
Transect 126: Primary and secondary substrates consisted of sand and mud. Overall fish and crab density was 0.02 individuals/m^2. Grenadiers ($n = 7$) accounted for 77% of the enumerated taxa. No vertical habitat was identified.

Area: Pribilof Canyon to Zhemchug Canyon					Transect 127
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/21/14	56.48	-172.71	874	557	NA

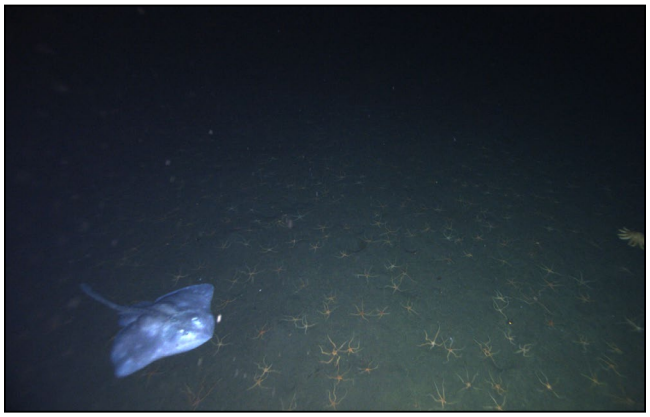








Images

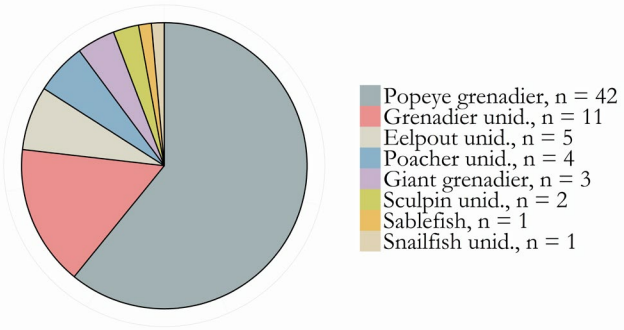


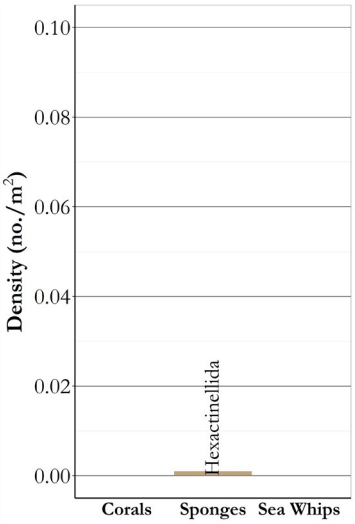
Summary - description of transect

Transect 127: Primary and secondary substrates consisted entirely of sand and mud. Species composition was evenly distributed between the 7 taxa identified. Overall fish and crab density was 0.03 individuals/m^2. No vertical habitat was identified.

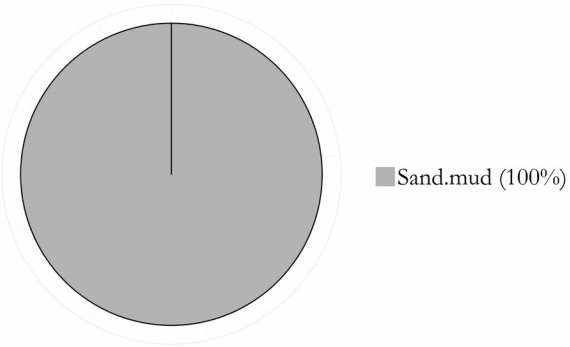
Area: Pribilof Canyon to Zhemchug Canyon					Transect 128
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/22/14	56.46	-172.67	1,090	662	3.3

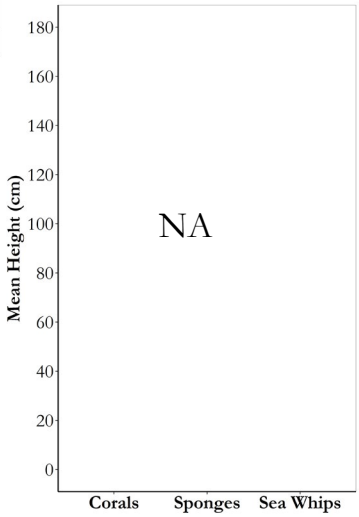
Fish and Crab Composition (n = 69)





Substrate Composition





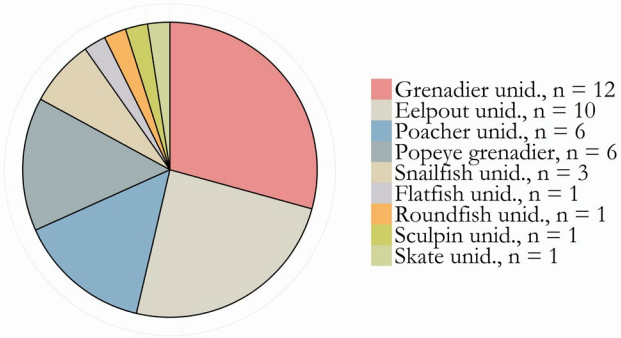
Images

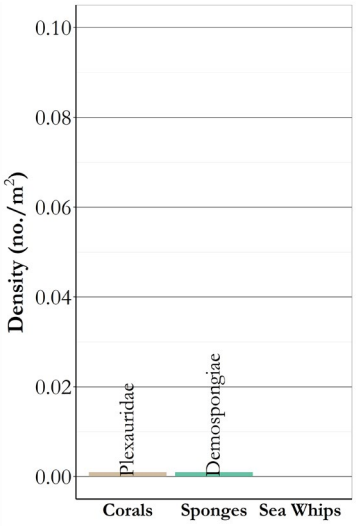
Summary - description of transect

Transect 128: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.06 individuals/m^2. Popeye grenadier ($n = 42$) accounted for 61% of the enumerated taxa. The next most abundant taxa were grenadiers at 16%. Vertical habitat consisted of 1 Hexactinellida. No corals were observed.

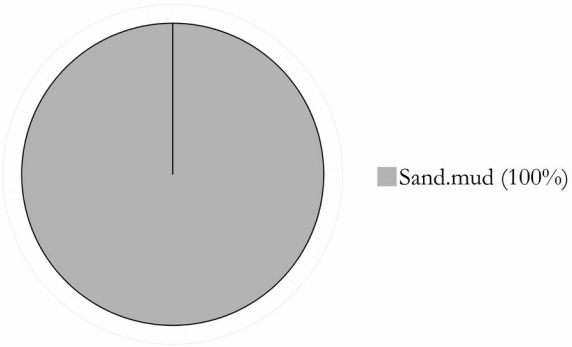
Area: Pribilof Canyon to Zhemchug Canyon					Transect 129
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/22/14	56.46	-172.75	915	713	3.3

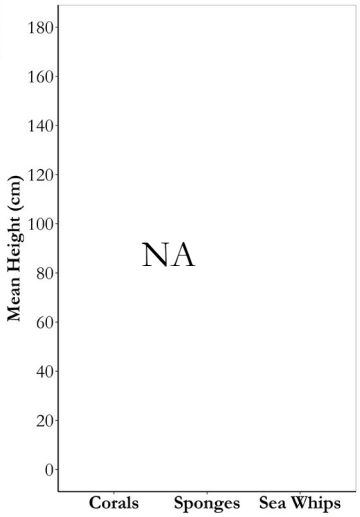
Fish and Crab Composition (n = 41)





Substrate Composition





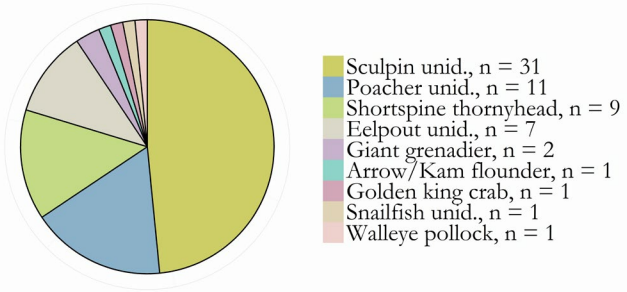
Images

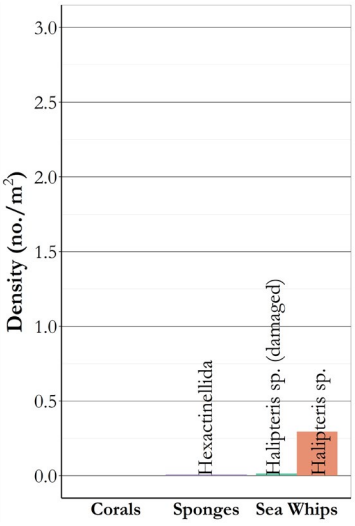
Summary - description of transect

Transect 129: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.05 individuals/m^2. Eelpouts and grenadiers accounted for 53% of the enumerated taxa. Poachers and popeye grenadiers accounted for another 30% of the abundance. Vertical habitat consisted of 1 Plexauridae and 1 Demospongiae, with a density of < 0.01 individuals/m^2. No sea whips were observed.

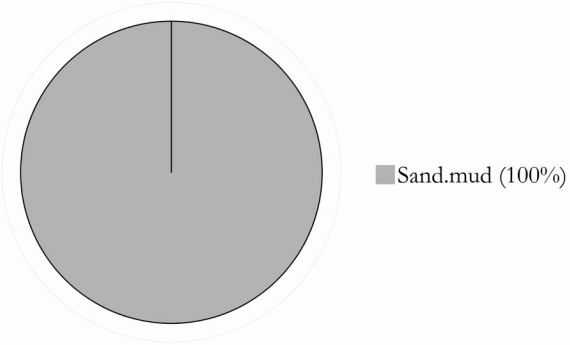
Area: Pribilof Canyon to Zhemchug Canyon					Transect 130
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/22/14	56.50	-172.74	1,289	431	3.8

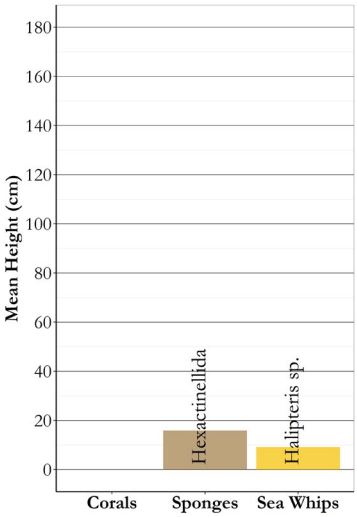
Fish and Crab Composition (n = 64)





Substrate Composition





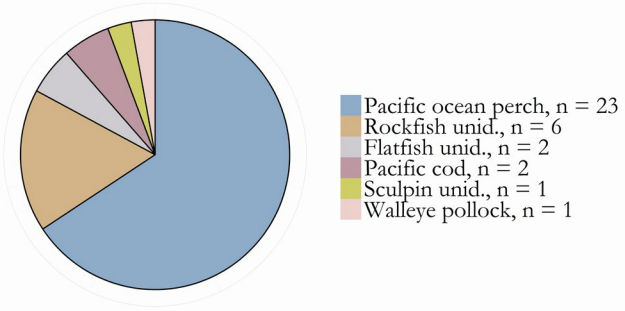
Images

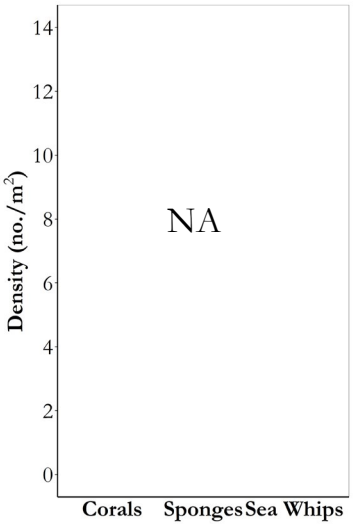
Summary - description of transect

Transect 130: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.05 individuals/m^2. Sculpins accounted for 48% of the enumerated taxa. The next most abundant taxa were poachers, shortspine thornyheads, and eelpouts at 42%. Vertical habitat consisted of 399 sea whips (18 damaged) and 10 Hexactinellida, with a density of 0.31 individuals/m^2. Sea whip heights ($n = 126$) ranged from 3.1 cm to 19.4 cm with a mean of 9.14 cm. Hexactinellida heights ($n = 2$) ranged from 11.6 cm to 20.2 cm, with a mean of 15.9 cm. No other corals were observed.

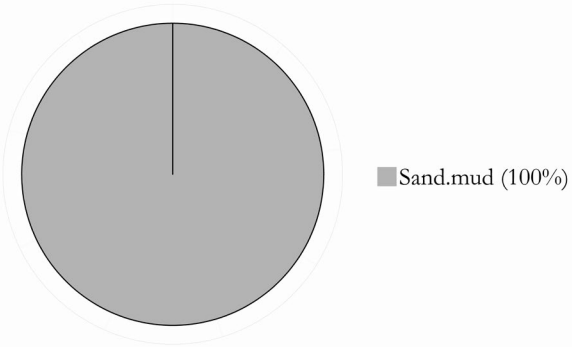
Area: Pribilof Canyon to Zhemchug Canyon					Transect 131
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/22/14	56.54	-172.79	2,009	306	3.9

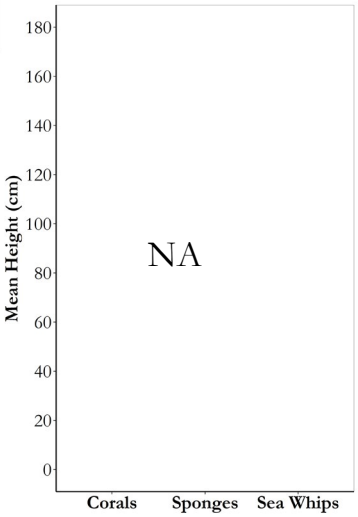
Fish and Crab Composition (n = 35)





Substrate Composition



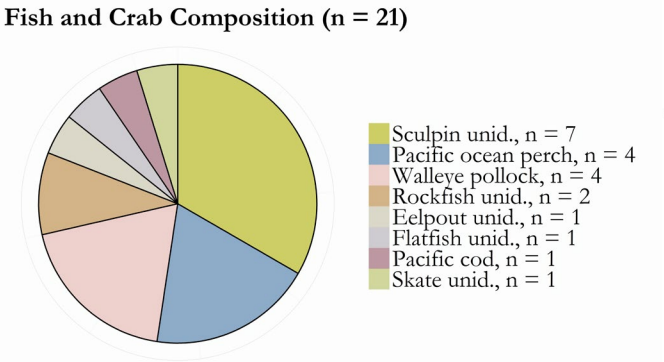


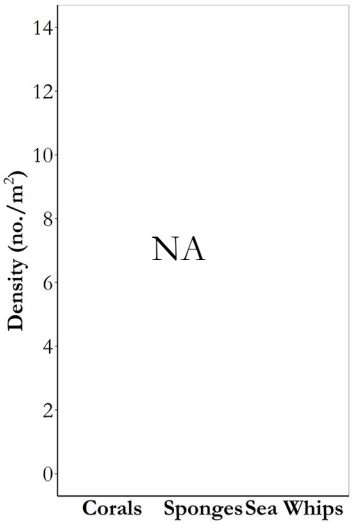
Images

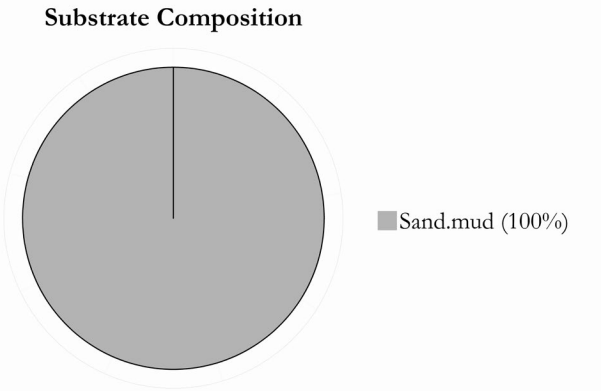
Summary - description of transect

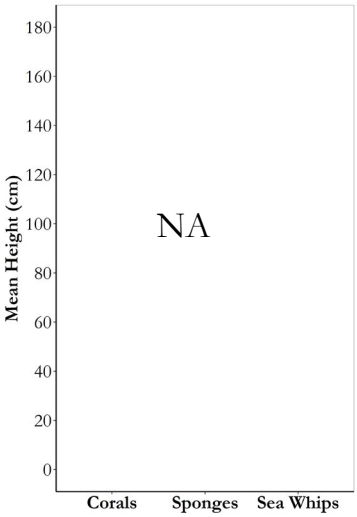
Transect 131: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.02 individuals/m^2. Pacific ocean perch accounted for 66% of the enumerated taxa. The next most abundant taxa were other rockfishes at 17%. No vertical habitat was observed.

Area: Pribilof Canyon to Zhemchug Canyon					Transect 132
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/22/14	56.56	-172.73	195	168	4.0

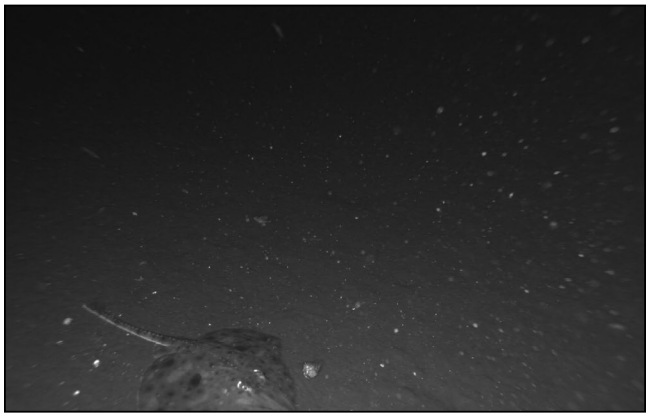








Images

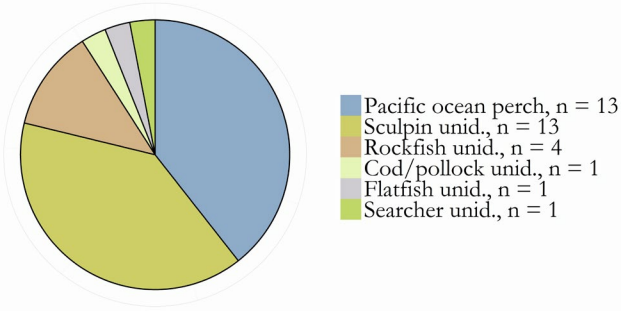


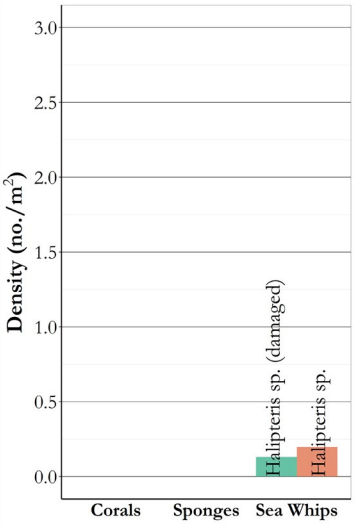
Summary - description of transect

Transect 132: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.11 individuals/m^2. Species composition was evenly distributed. Sculpins, Pacific ocean perch, and walleye pollock accounted for 71% of the enumerated taxa. No vertical habitat was observed.

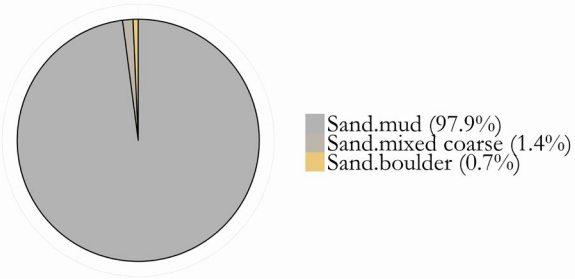
Area: Pribilof Canyon to Zhemchug Canyon					Transect 133
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/22/14	56.63	-172.95	1,477	142	4.3

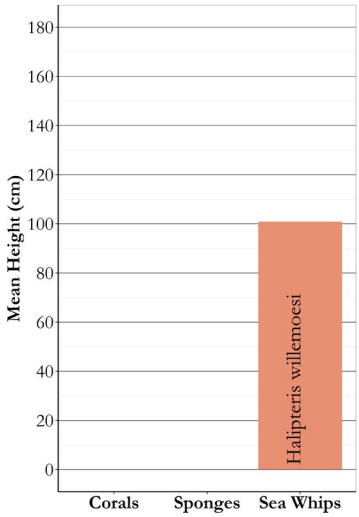
Fish and Crab Composition (n = 33)



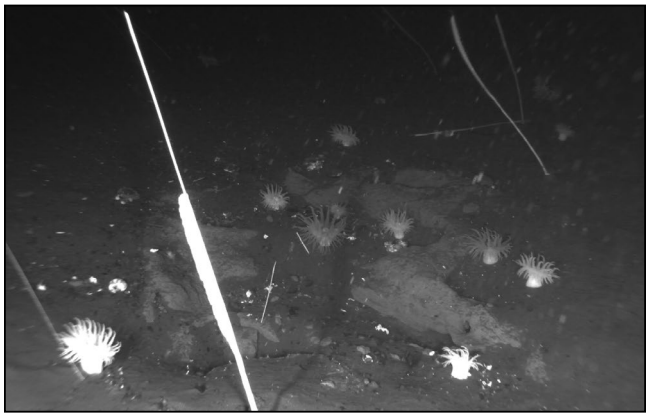


Substrate Composition





Images

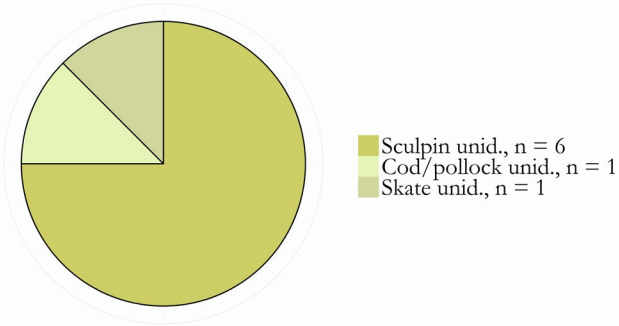


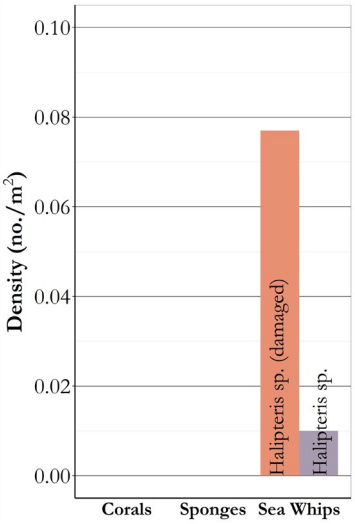
Summary - description of transect

Transect 133: Primary and secondary substrates were 96% sand and mud. The remaining substrates were a mixture of sand, mixed coarse, and boulder (2%). Overall fish and crab density was 0.02 individuals/m^2. Pacific ocean perch and sculpins accounted for 78% of the enumerated taxa. The next most abundant taxa were other rockfishes at 12%. Vertical habitat consisted of 486 sea whips (194 damaged), with a density of 0.33 individuals/m^2. Sea whip heights ($n = 76$) ranged from 65.0 cm to 130.9 cm with a mean of 100.8 cm. No other corals or sponges were observed.

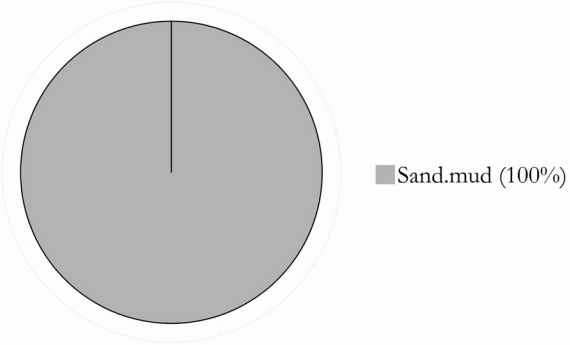
Area: Pribilof Canyon to Zhemchug Canyon					Transect 134
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/22/14	56.66	-173.07	1,499	142	4.0

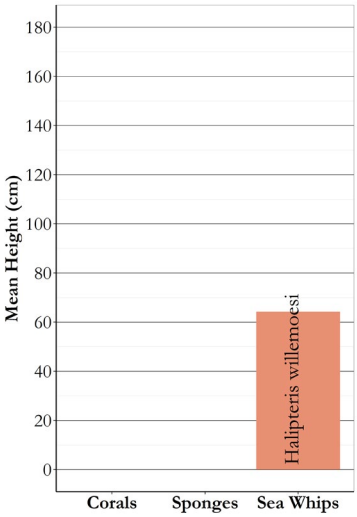
Fish and Crab Composition (n = 8)



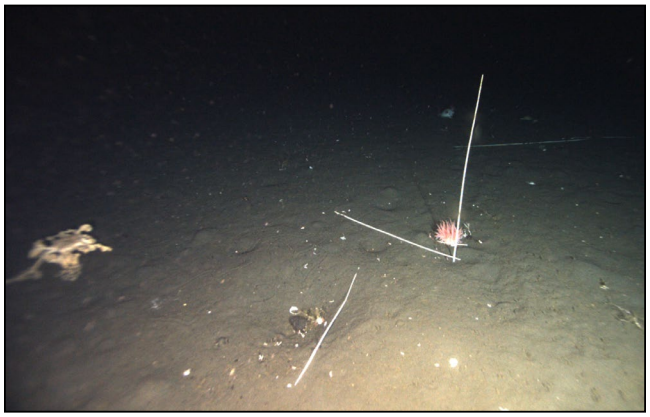


Substrate Composition





Images

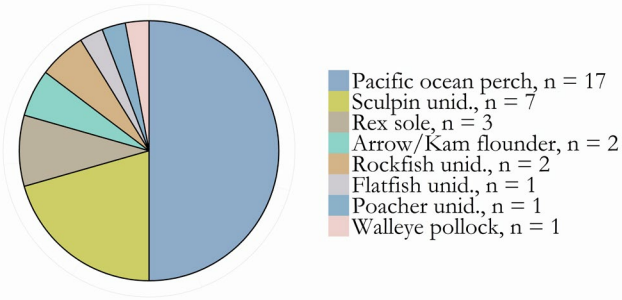


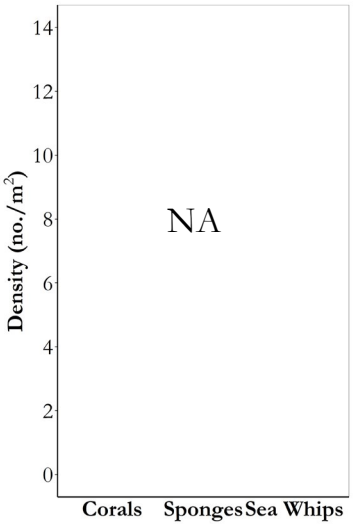
Summary - description of transect

Transect 134: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was very low, 0.01 individuals/m^2. Only 7 individuals were identified with sculpins accounting for 75% of the enumerated taxa. Vertical habitat consisted of 131 sea whips (116 damaged), with a density of 0.09 individuals/m^2. Sea whip heights ($n = 3$) ranged from 56.4 cm to 74.6 cm with a mean of 64.2 cm. No other corals or sponges were observed.

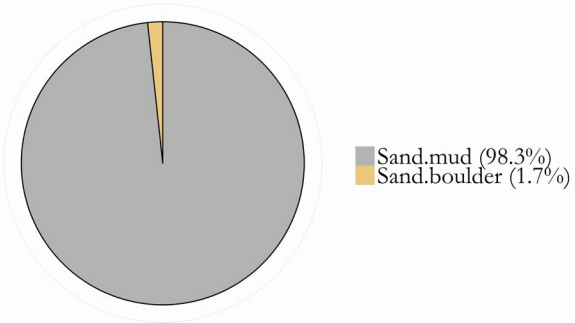
Area: Pribilof Canyon to Zhemchug Canyon					Transect 135
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/22/14	56.66	-173.14	1,790	214	3.9

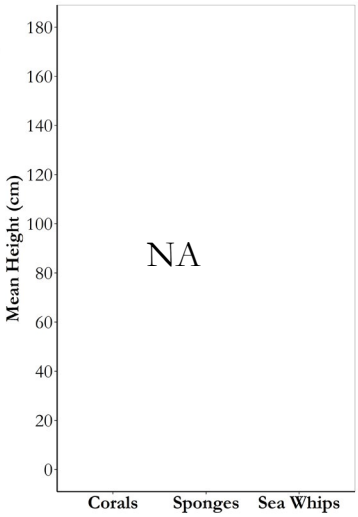
Fish and Crab Composition (n = 34)



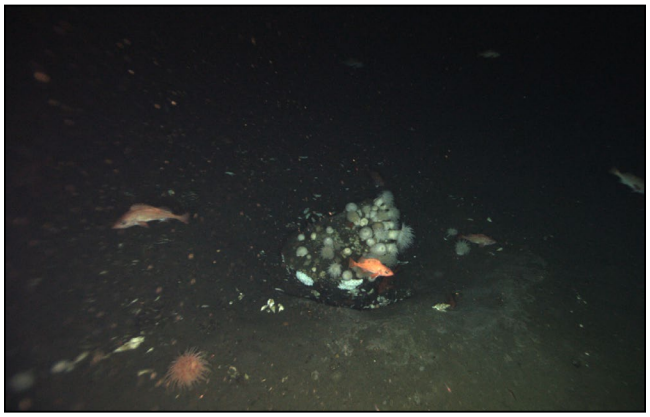


Substrate Composition





Images

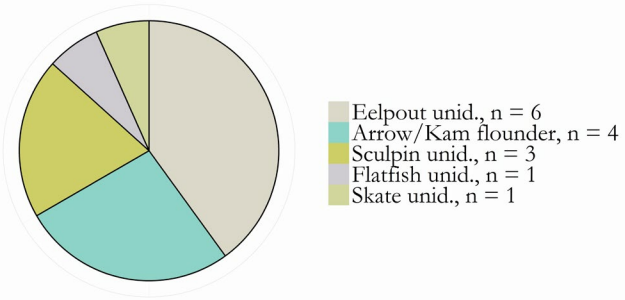


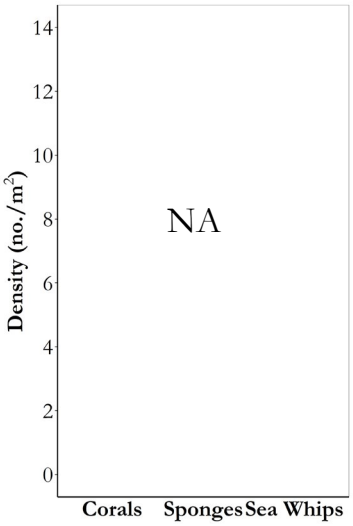
Summary - description of transect

Transect 135: Primary and secondary substrates consisted of 98% sand and mud and 2% sand and boulders. Overall fish and crab density was 0.02 individuals/m^2. Pacific ocean perch accounted for 50% of the enumerated taxa. The next most abundant taxa were sculpins at 21%. No vertical habitat was observed.

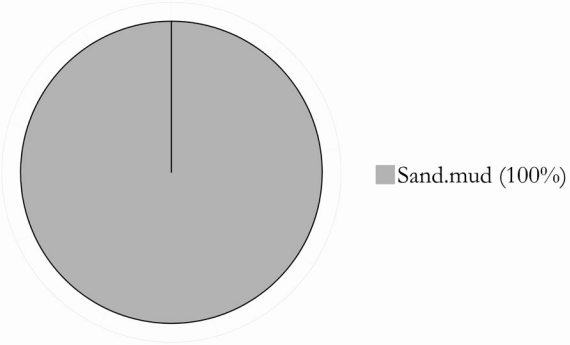
Area: Pribilof Canyon to Zhemchug Canyon					Transect 137
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/22/14	56.75	-173.23	880	138	4.2

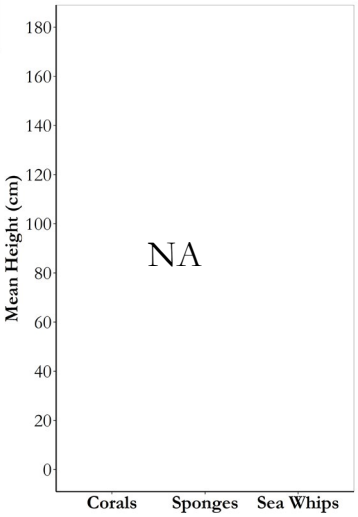
Fish and Crab Composition (n = 15)





Substrate Composition



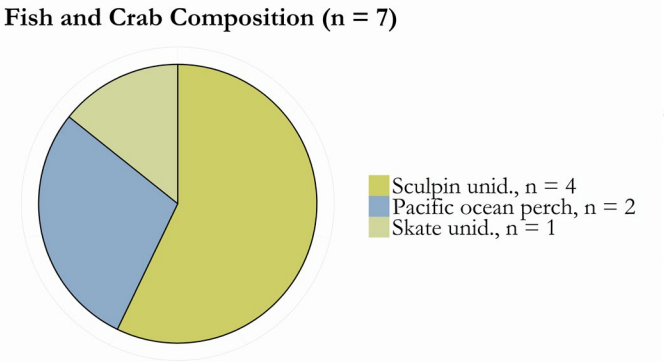


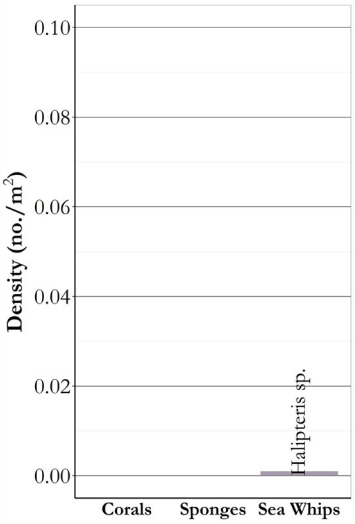
Images

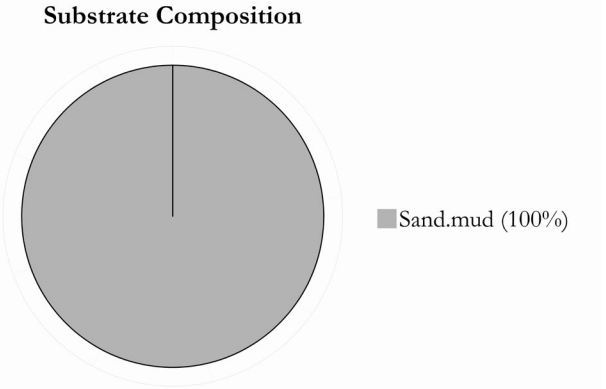
Summary - description of transect

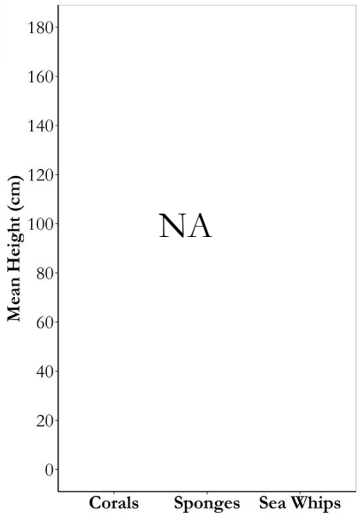
Transect 137: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.02 individuals/m^2. Eelpouts and arrowtooth/Kamchatka flounder accounted for 67% of the enumerated taxa. One skate was identified. No vertical habitat was observed.

Area: Pribilof Canyon to Zhemchug Canyon					Transect 138
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/22/14	56.84	-173.33	926	163	4.2

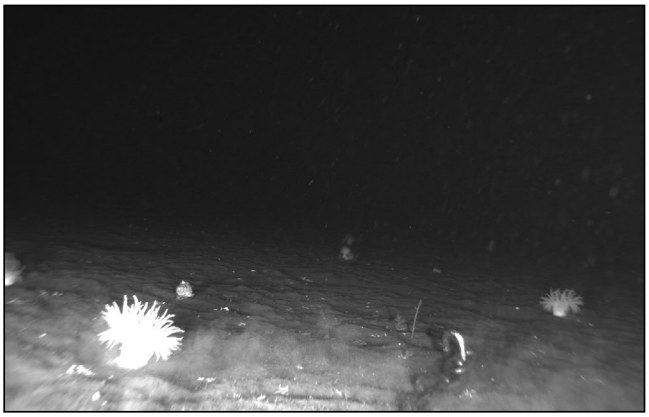


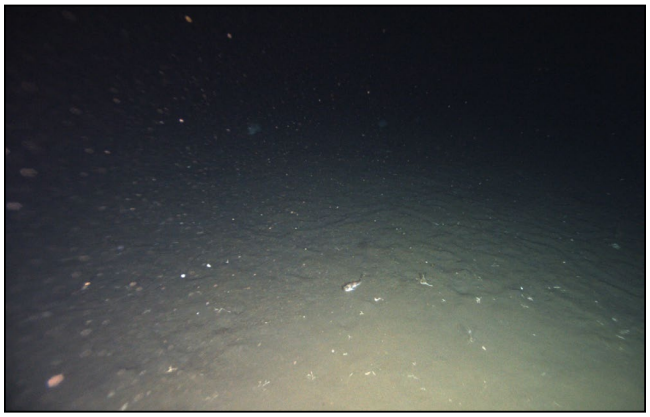






Images



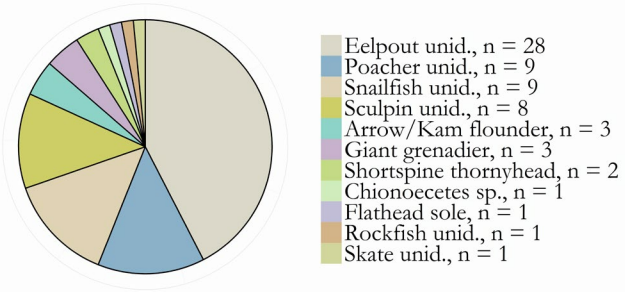


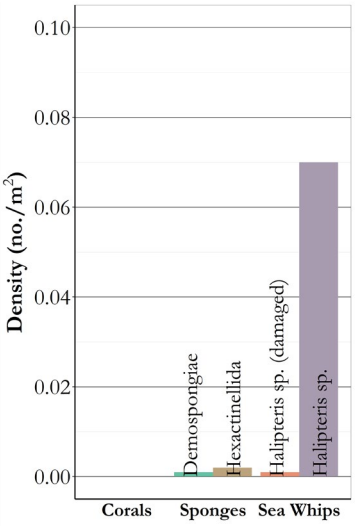
Summary - description of transect

Transect 138: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.01 individuals/m^2. Sculpins (57%), Pacific ocean perch (29%) and skates (14%) accounted for 100% of the enumerated taxa. Vertical habitat consisted of 1 *Halipteris*. No other corals or sponges were observed.

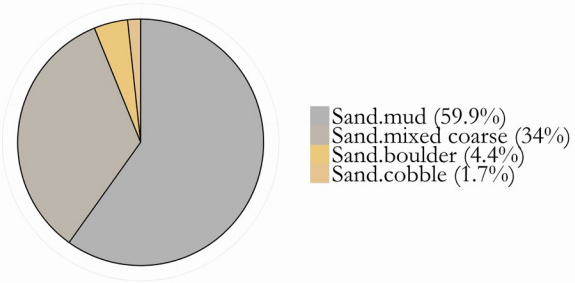
Area: Pribilof Canyon to Zhemchug Canyon					Transect 139
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/22/14	56.88	-173.41	1,004	515	3.7

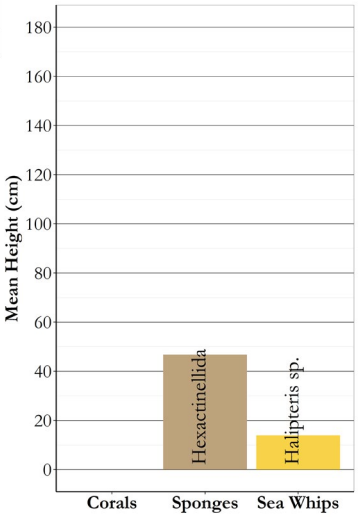
Fish and Crab Composition (n = 66)





Substrate Composition





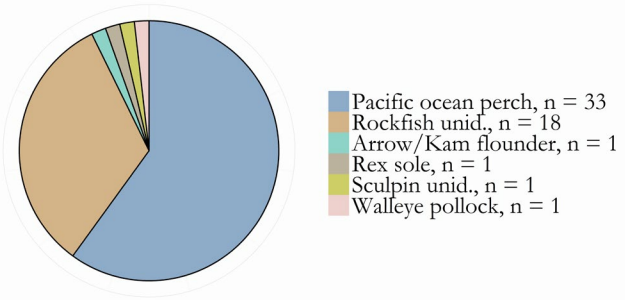
Images

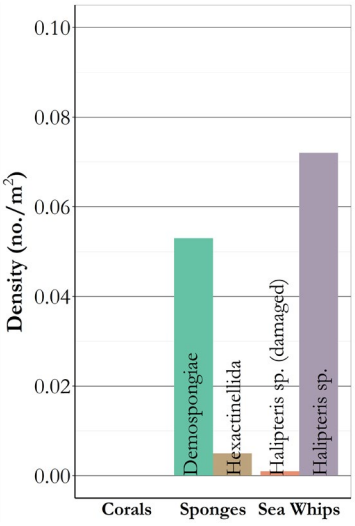
Summary - description of transect

Transect 139: Primary and secondary substrates consisted of primarily of sand and mud (60%) and sand and mixed coarse (34%). The remaining 6% was sand and boulder or cobble. Overall fish and crab density was 0.07 individuals/m^2. Eelpouts accounted for 42% of the enumerated taxa. The next most abundant taxa were poachers, snailfishes, and eelpouts which combined for 39%. Vertical habitat consisted of 71 sea whips (1 damaged), 1 Demospongiae, and 2 Hexactinellida, with a density of 0.07 individuals/m^2. Sea whip heights ($n = 22$) ranged from 6.8 cm to 29.7 cm with a mean of 13.9 cm. Hexactinellida heights ($n = 2$) ranged from 34.2 cm to 58.4 cm, with a mean of 46.8 cm. No other corals were observed.

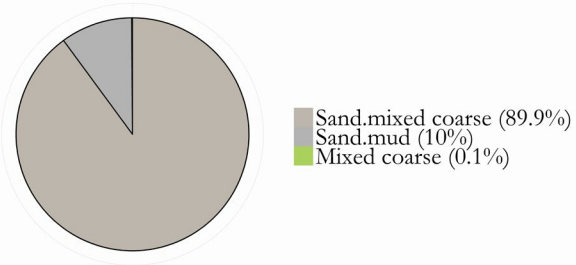
Area: Pribilof Canyon to Zhemchug Canyon					Transect 140
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/22/14	56.89	-173.38	1,338	273	4.0

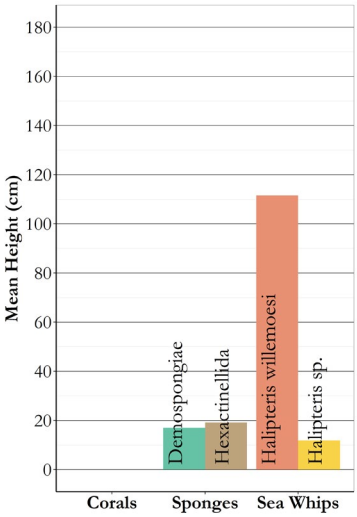
Fish and Crab Composition (n = 55)



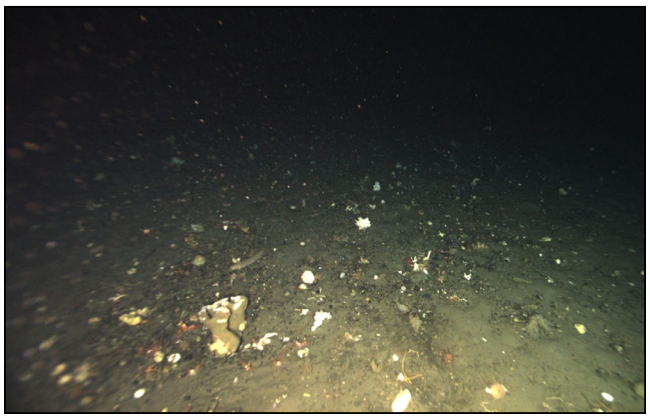


Substrate Composition





Images

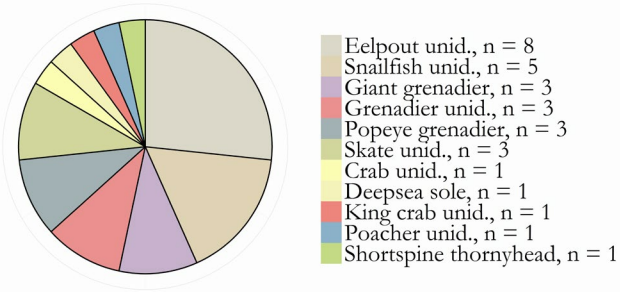


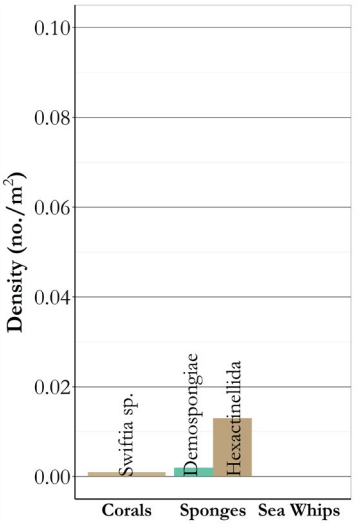
Summary - description of transect

Transect 140: Primary and secondary substrates consisted primarily of sand and mixed coarse (90%). Overall fish and crab density was 0.04 individuals/m^2. Pacific ocean perch accounted for 60% of the enumerated taxa. The next most abundant taxa were other rockfishes at 33%. Vertical habitat consisted of 97 sea whips (1 damaged), 71 Demospongiae, and 7 Hexactinellida, with a density of 0.13 individuals/m^2. Sea whips were identified as *Halipteris* sp. and *Halipteris willemoesi* for height measurements. *Halipteris* sp. heights ($n = 25$) ranged from 5.5 cm to 21.4 cm with a mean of 11.8 cm. *Halipteris willemoesi* heights ($n = 2$) ranged from 111.4 cm to 111.7 cm with a mean of 111.5 cm. Hexactinellida heights ($n = 3$) ranged from 11.8 cm to 24.4 cm, with a mean of 19.1 cm. No other corals were observed.

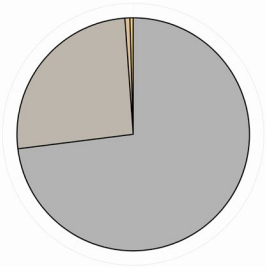
Area: Pribilof Canyon to Zhemchug Canyon					Transect 141
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/23/14	56.94	-173.67	1,005	770	3.1

Fish and Crab Composition (n = 30)

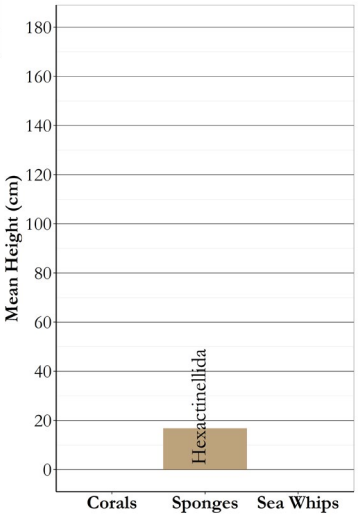




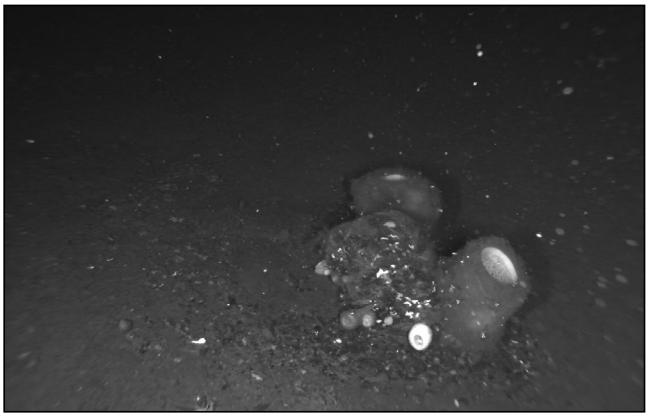
Substrate Composition



Sand.mud (73%)
Sand.mixed coarse (25.8%)
Sand.gravel (0.7%)
Sand.boulder (0.5%)



Images

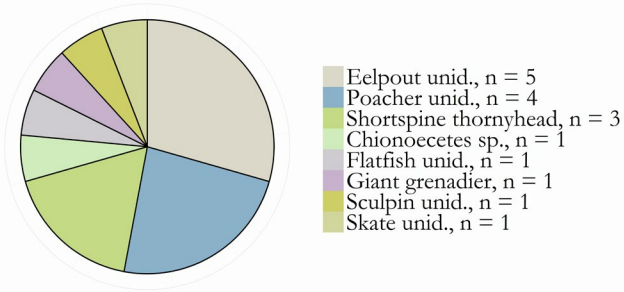


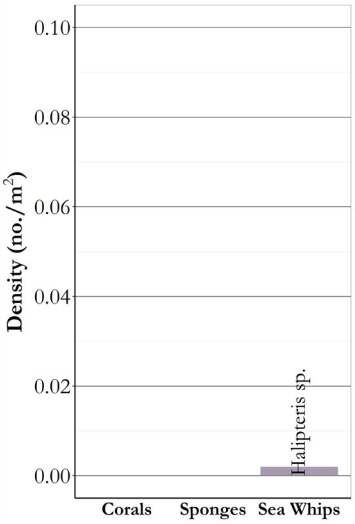
Summary - description of transect

Transect 141: Primary and secondary substrates consisted largely of sand and mixed coarse (75%) and sand and mud (26%). Overall fish and crab density was 0.03 individuals/m^2. Eelpouts accounted for 27% of the enumerated taxa. The next most abundant taxa were snailfishes at 17%. Vertical habitat consisted of 1 *Swiftia* sp., 13 Hexactinellida, and 2 Demospongiae, with an overall density of 0.16 individuals/m^2. Hexactinellida heights (n = 8) ranged from 10.5 cm to 31.2 cm, with a mean of 16.8 cm. No sea whips were observed.

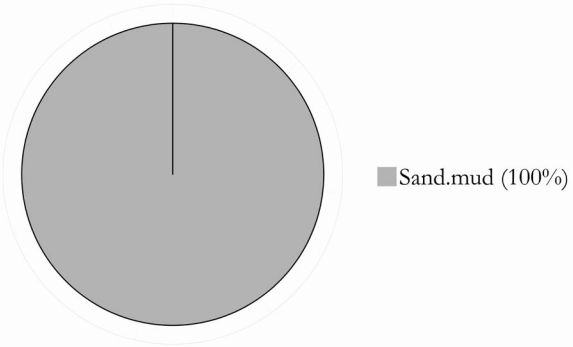
Area: Pribilof Canyon to Zhemchug Canyon					Transect 142
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/23/14	56.95	-173.43	1,025	519	3.6

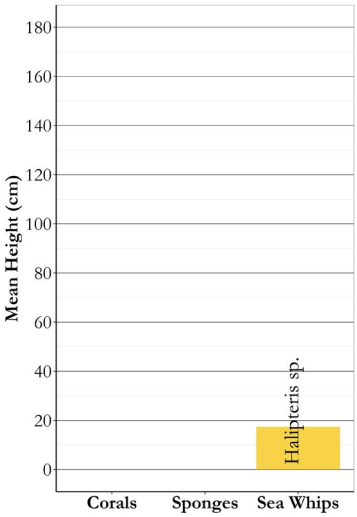
Fish and Crab Composition (n = 17)





Substrate Composition





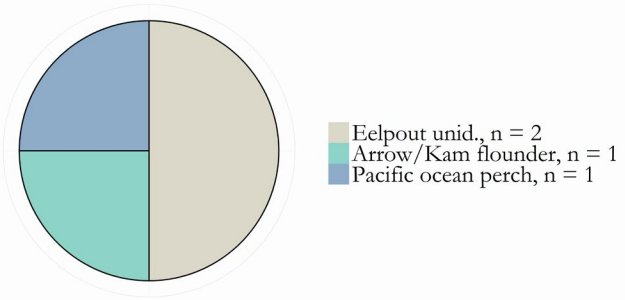
Images

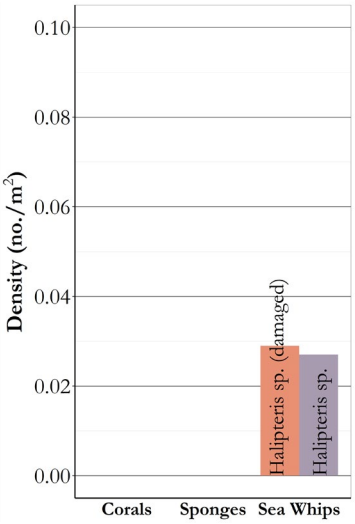
Summary - description of transect

Transect 142: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.02 individuals/m^2. Seventeen individuals were identified in eight taxa. Eelpouts (29%), poachers (24%), and shortspine thornyheads (18%) accounted for 71% of the enumerated taxa. Vertical habitat consisted of 2 sea whips. No other corals or sponges were observed.

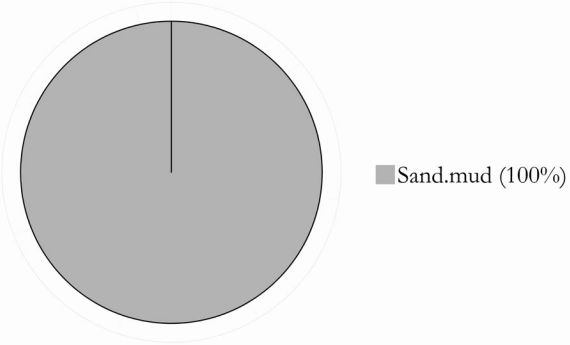
Area: Pribilof Canyon to Zhemchug Canyon					Transect 151
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/25/14	57.67	-174.13	1,312	136	4.0

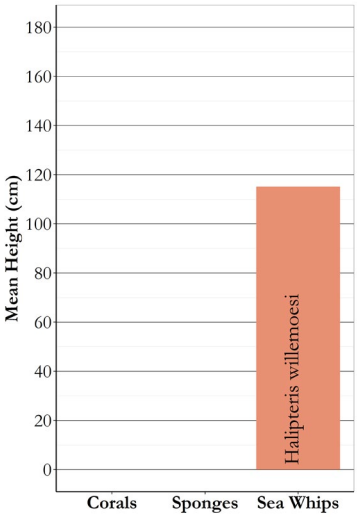
Fish and Crab Composition (n = 4)



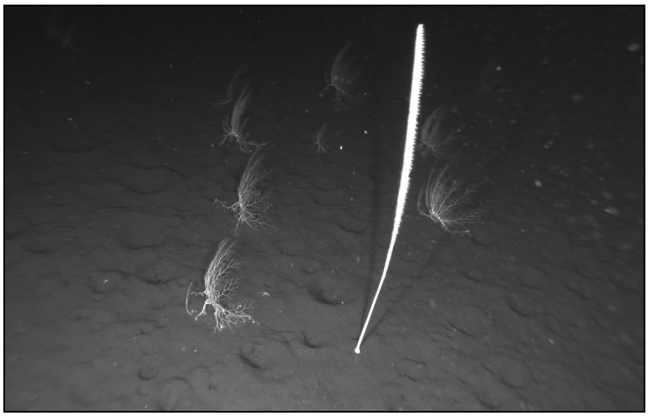


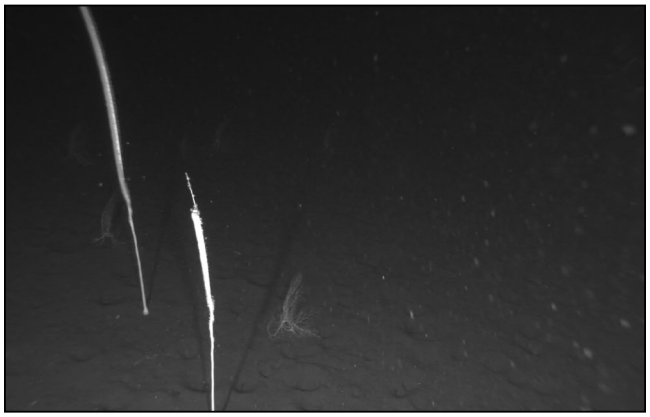
Substrate Composition





Images



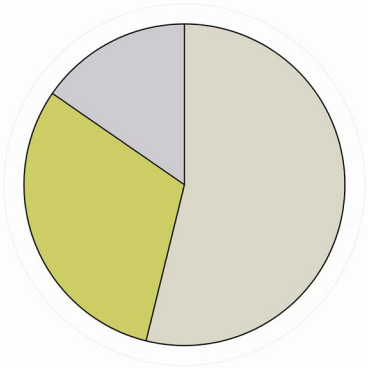


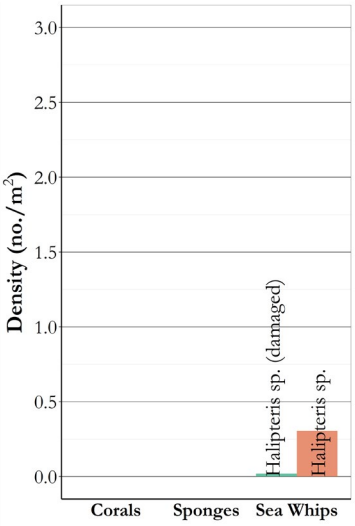
Summary - description of transect

Transect 151: Primary and secondary substrates consisted entirely of sand and mud. Only four fish were counted for this transect resulting in a low species density (< 0.01 individuals/m^2). Vertical habitat consisted entirely of sea whips ($n = 73$). Over half ($n = 38$) of these sea whips were damaged. Sea whip density was 0.06 individuals/m^2. Six sea whips were measured and their mean height was 115.1 cm. No other corals or sponges were identified.

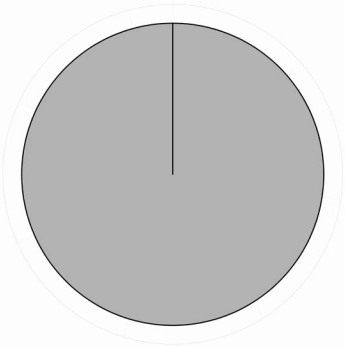
Area: Pribilof Canyon to Zhemchug Canyon					Transect 154
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/25/14	57.59	-174.00	1,630	132	4.1

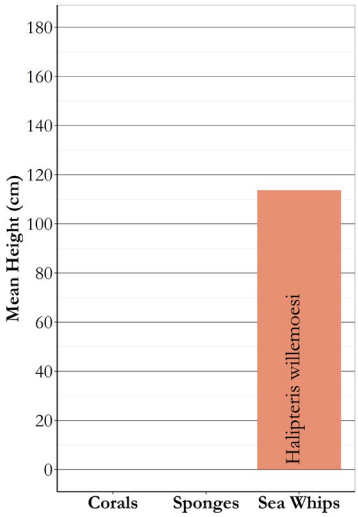
Fish and Crab Composition (n = 13)



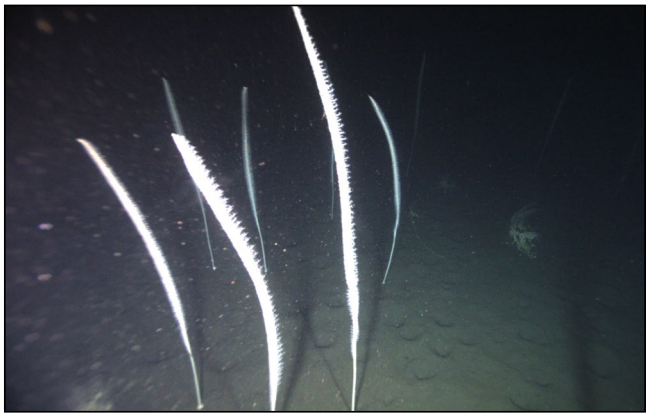


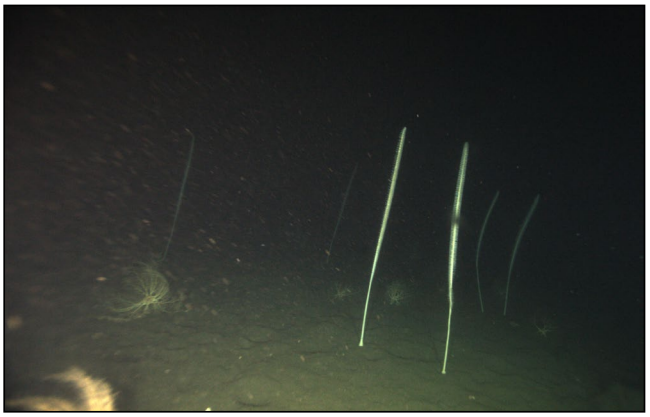
Substrate Composition





Images



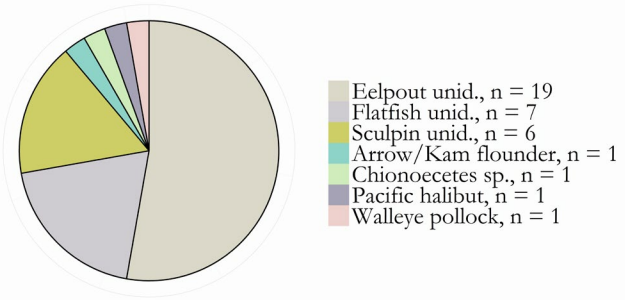


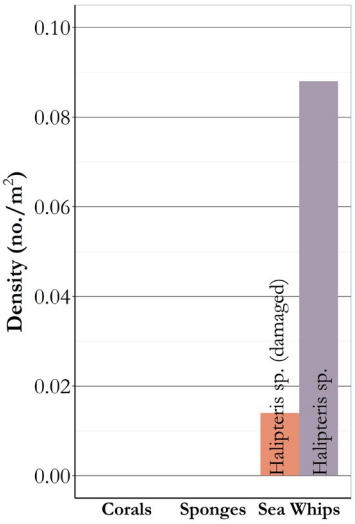
Summary - description of transect

Transect 154: Primary and secondary substrates consisted entirely of sand and mud. Fish density was low (0.01 individuals/m^2), with only 13 individuals counted. Vertical habitat consisted of 530 sea whips (32 damaged). Sea whip density was 0.33 individuals/m^2. Mean height for 35 measured *Halipteris willemoesi* was 113.7 cm. No other corals or sponges were identified.

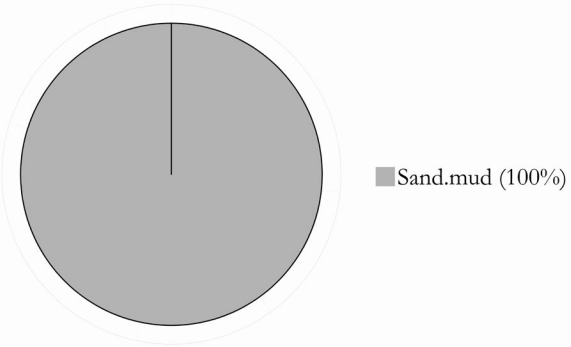
Area: Pribilof Canyon to Zhemchug Canyon					Transect 155
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/25/14	57.57	-173.98	1,752	134	4.1

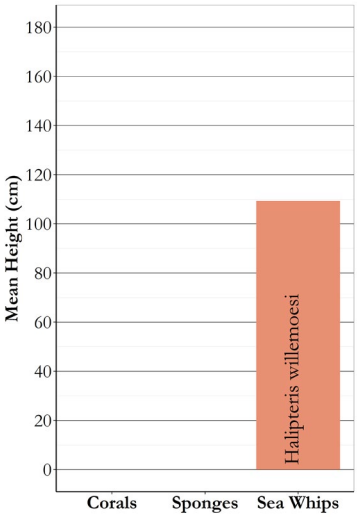
Fish and Crab Composition (n = 36)



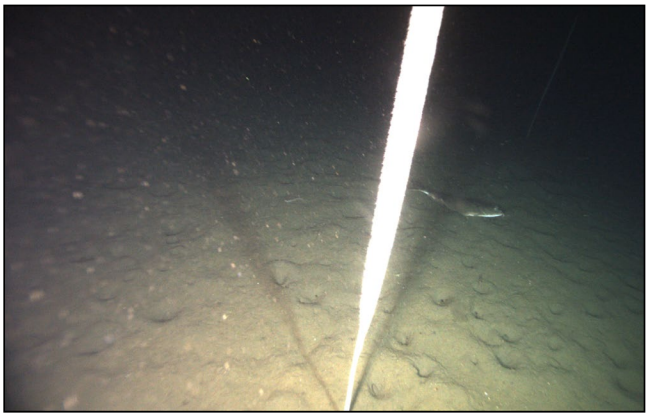


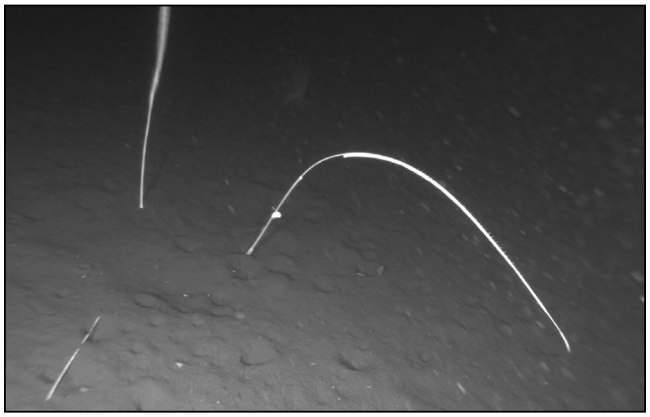
Substrate Composition





Images



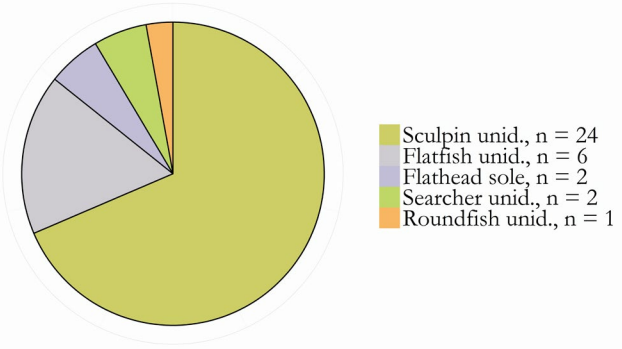


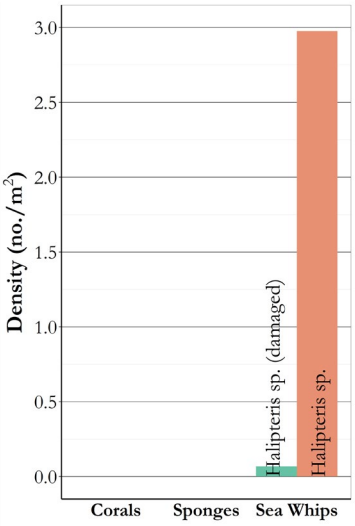
Summary - description of transect

Transect 155: Primary and secondary substrates consisted of sand and mud. Of the 36 individuals counted, over half (53%) were eelpouts, and another 42% were sculpins and flatfishes. Species density was 0.02 individuals/m^2. Vertical habitat consisted of 179 sea whips (25 damaged). Sea whip density was 0.10 individuals/m^2. Mean height for 24 measured *Halipteris willemoesi* was 109.3 cm. No other corals or sponges were identified.

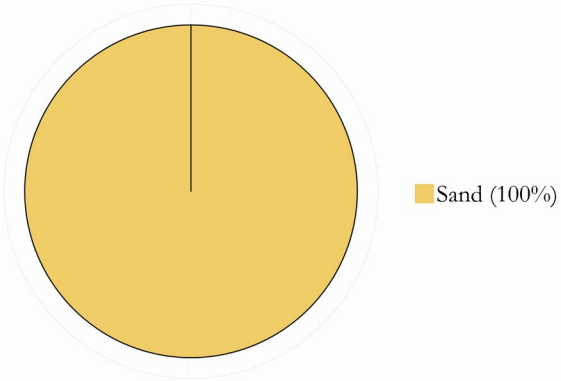
Area: Pribilof Canyon to Zhemchug Canyon					Transect 156
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/25/14	57.57	-174.04	1,375	141	4.1

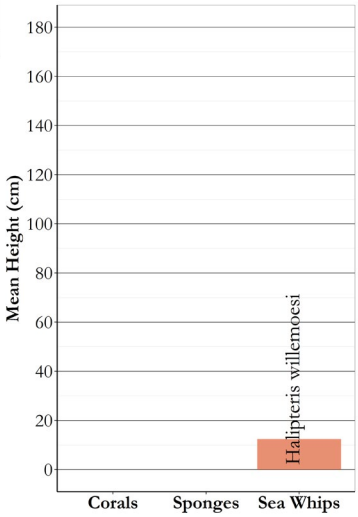
Fish and Crab Composition (n = 35)



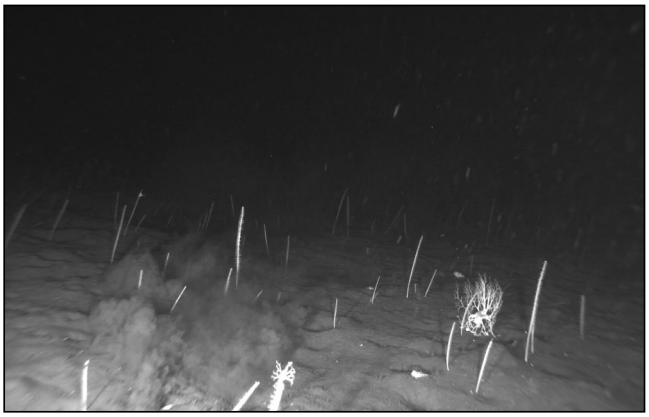


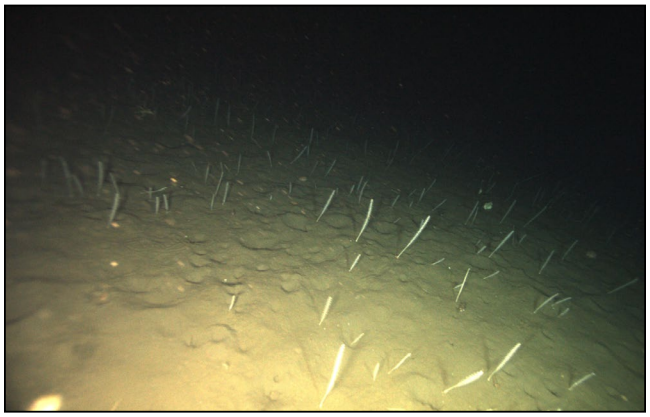
Substrate Composition





Images



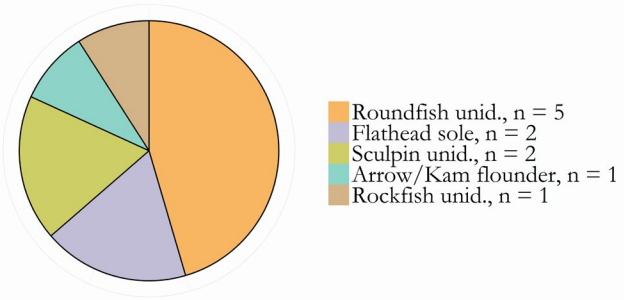


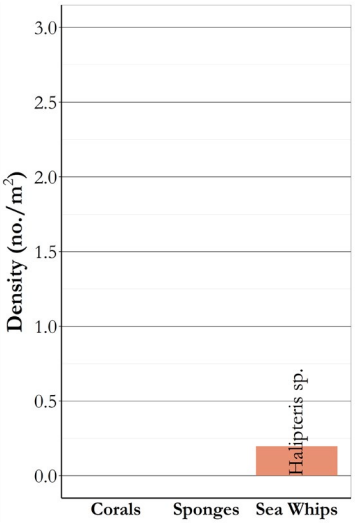
Summary - description of transect

Transect 156: Primary and secondary substrates consisted of sand. Of the 35 individuals counted, 69% were sculpins, and another 23% were flatfishes. Species density was 0.03 individuals/m^2. Vertical habitat consisted of 4,185 sea whips (94 damaged). The second highest sea whip density (3.04 individuals/m^2) was at this transect. Most of the individuals observed were short *Halipteris willemoesi*, mean height for 193 individuals was 12.4 cm. No other corals or sponges were identified.

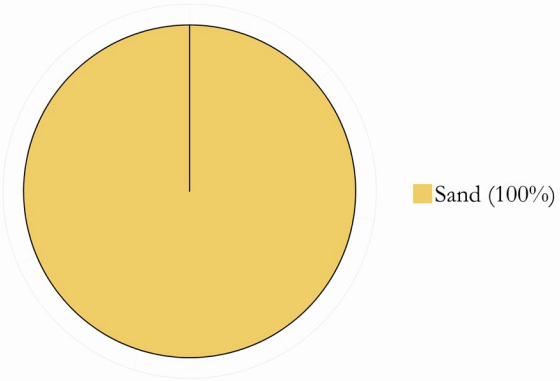
Area: Pribilof Canyon to Zhemchug Canyon					Transect 157
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/25/14	57.58	-173.99	1,322	133	4.1

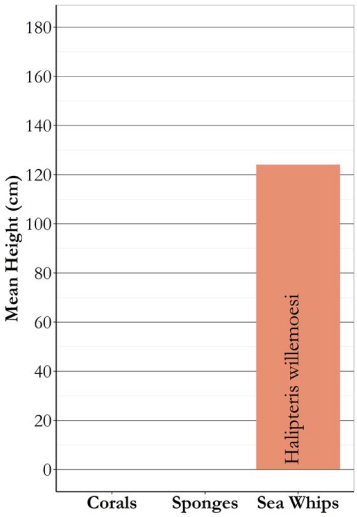
Fish and Crab Composition (n = 11)



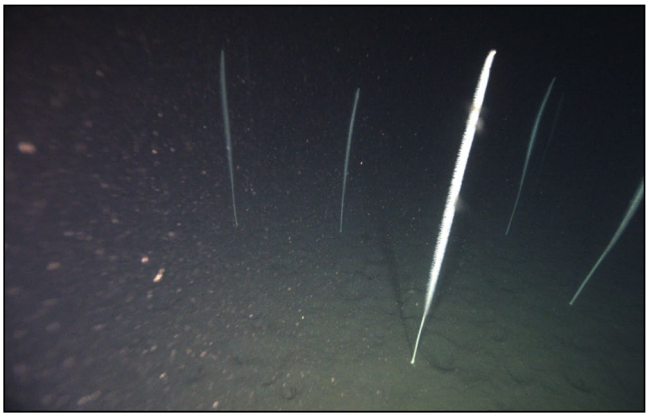


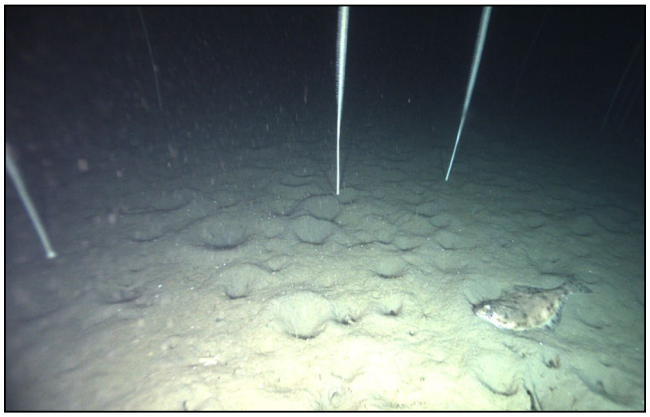
Substrate Composition





Images

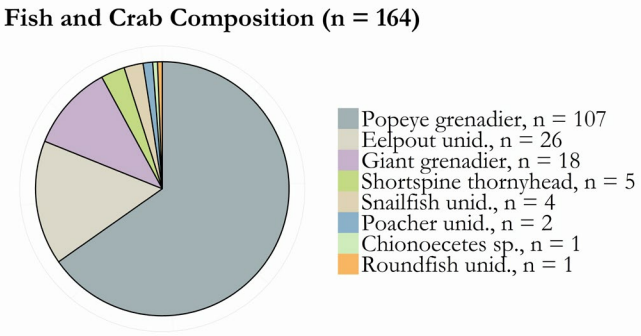


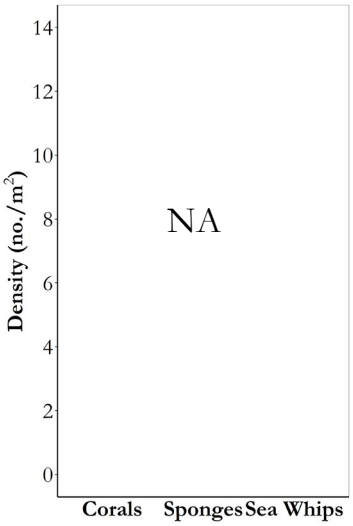


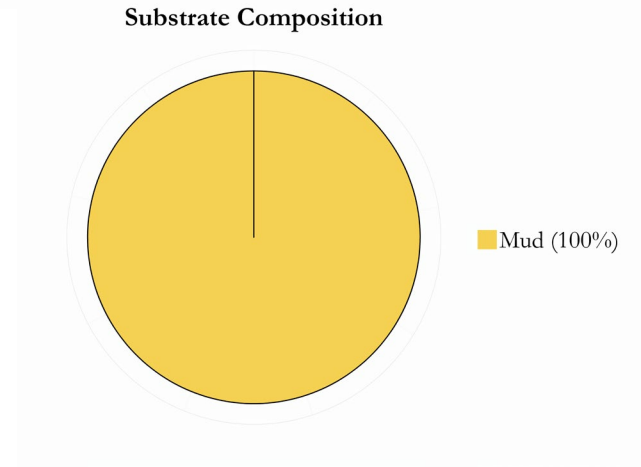
Summary - description of transect

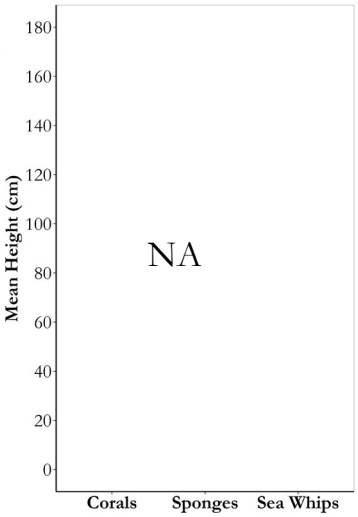
Transect 157: Primary and secondary substrates consisted of sand. Only 11 individuals were counted for this transect, resulting in a low species density (0.01 individuals/m^2). Vertical habitat consisted of 260 sea whips. Sea whip density was 0.20 individuals/m^2. Mean height for 67 measured *Halipteris willemoesi* was 124.1 cm. No other corals or sponges were identified.

Area: Pribilof Canyon to Zhemchug Canyon					Transect 158
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/25/14	57.50	-174.00	469	796	3.2

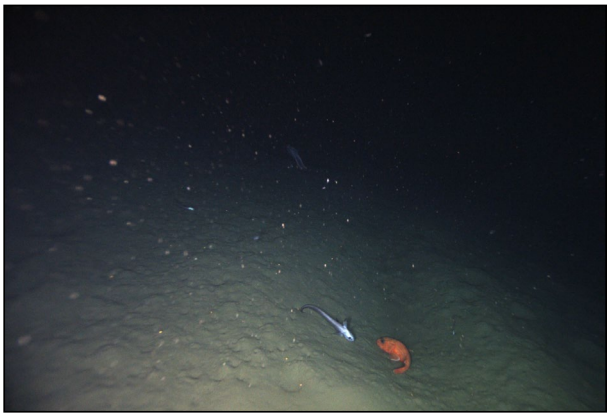


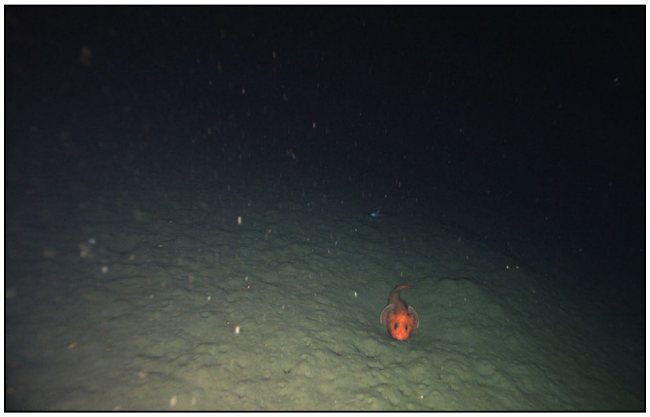






Images



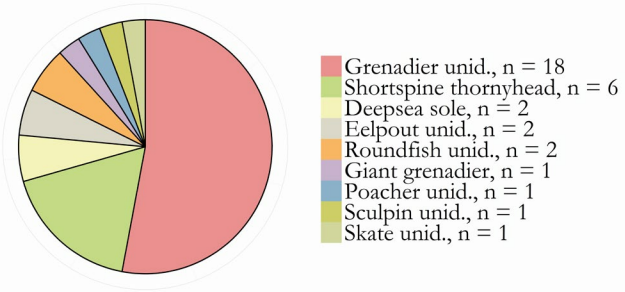


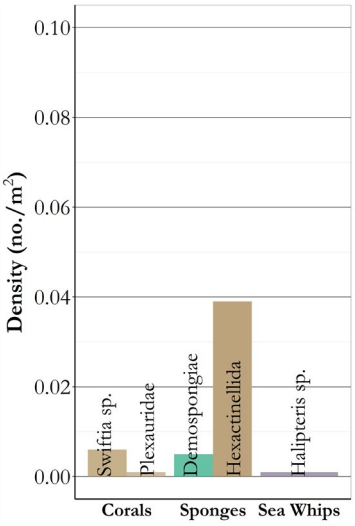
Summary - description of transect

Transect 158: Primary and secondary substrates consisted entirely of mud. Of the 164 individuals counted, 65% were popeye grenadiers, and another 27% were eelpouts and giant grenadiers. Species density was 0.35 individuals/m^2. No vertical habitat was identified.

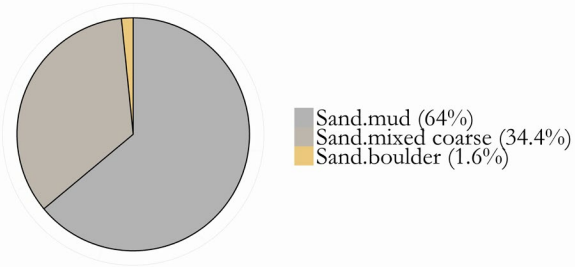
Area: Pribilof Canyon to Zhemchug Canyon					Transect 161
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/26/14	57.00	-173.50	1,380	695	3.3

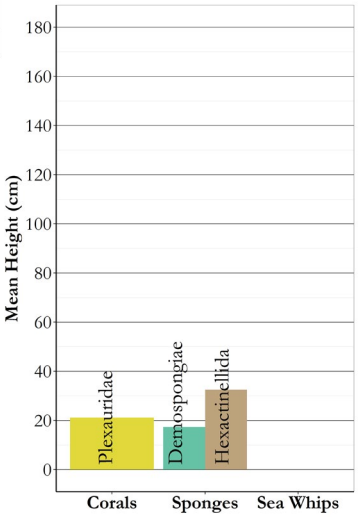
Fish and Crab Composition (n = 34)





Substrate Composition



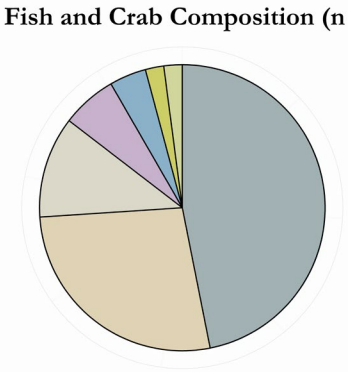


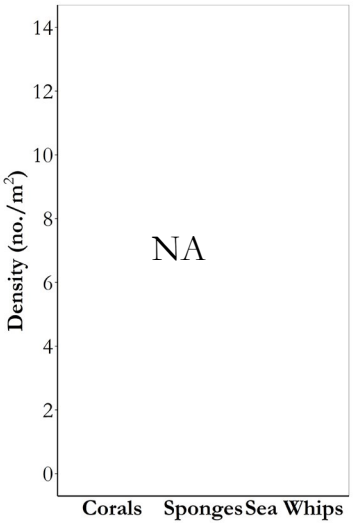
Images

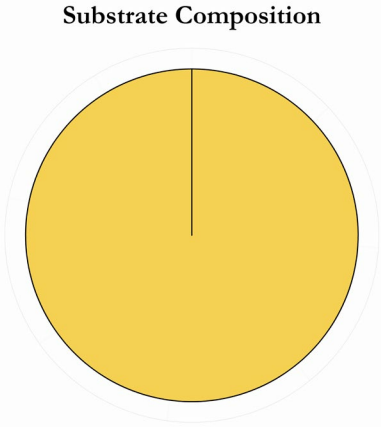
Summary - description of transect

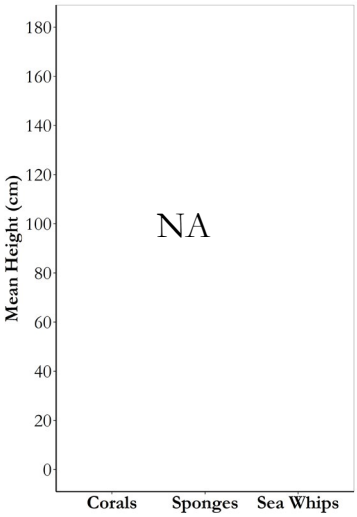
Transect 161: Primary and secondary substrates consisted entirely of sand and mud or sand and mixed coarse (98%). Sand and boulders accounted for the remaining 2% of the transect substrate. Overall fish and crab density was 0.03 individuals/m^2. Grenadiers accounted for 53% of the enumerated taxa. The next most abundant taxon was shortspine thornyheads at 18%. Vertical habitat consisted of 61 sponges, 8 *Swiftia* sp., 2 Plexauridae, and 1 sea whip, with a density of 0.05 individuals/m^2. Demospongiae heights ($n = 2$) ranged from 13.3 cm to 21.4 cm with a mean of 17.3 cm. Hexactinellida heights ($n = 8$) ranged from 18.6 cm to 48.3 cm with a mean of 32.5 cm. Plexauridae heights ($n = 2$) ranged from 14.6 cm to 27.7 cm with a mean of 21.2 cm.

Area: Pribilof Canyon to Zhemchug Canyon					Transect 162
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/26/14	57.03	-173.82	1,380	695	3.3

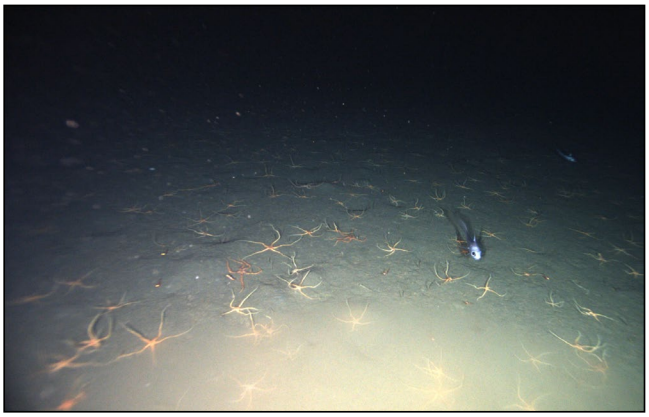


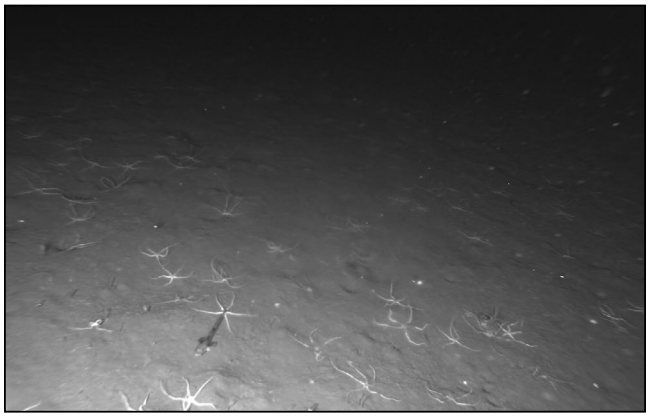






Images

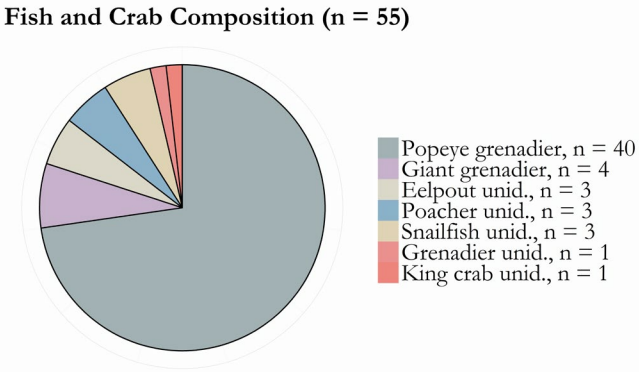


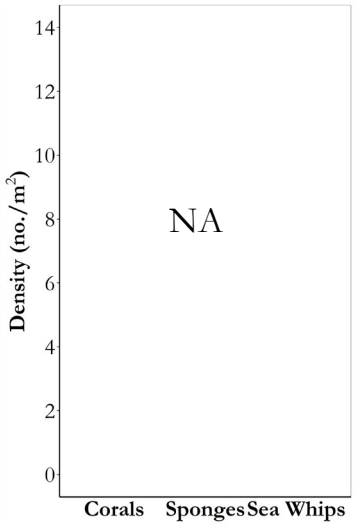


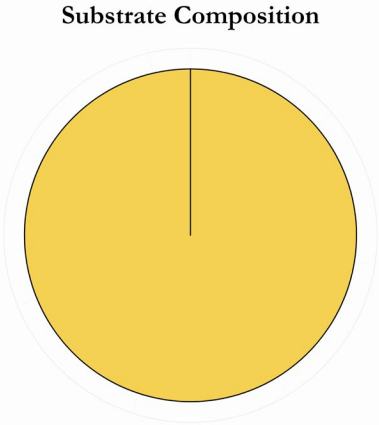
Summary - description of transect

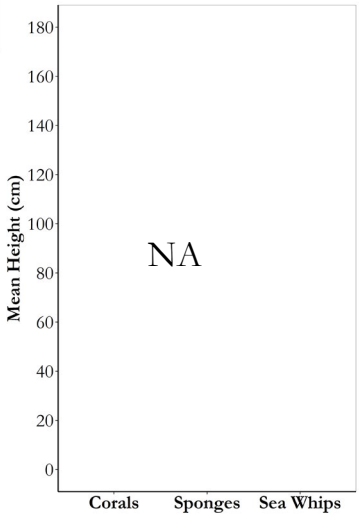
Transect 162: Primary and secondary substrates consisted entirely of mud. Overall fish and crab density was 0.08 individuals/m^2. Popeye grenadiers accounted for 47% of the enumerated taxa. The next most abundant taxon was snailfishes at 27%. No vertical habitat was observed.

Area: Pribilof Canyon to Zhemchug Canyon					Transect 163
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/26/14	56.99	-173.92	1,293	777	3.2







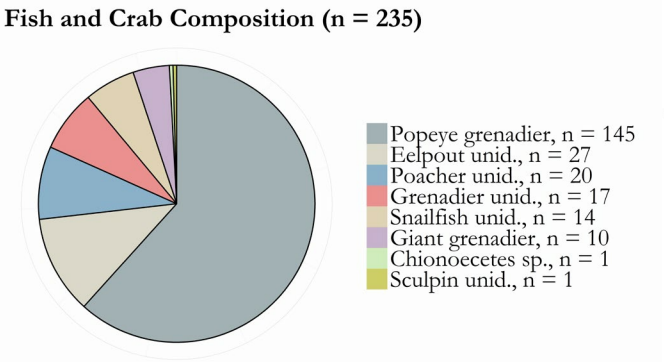


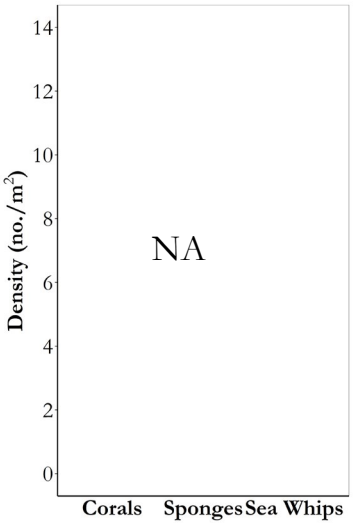
Images

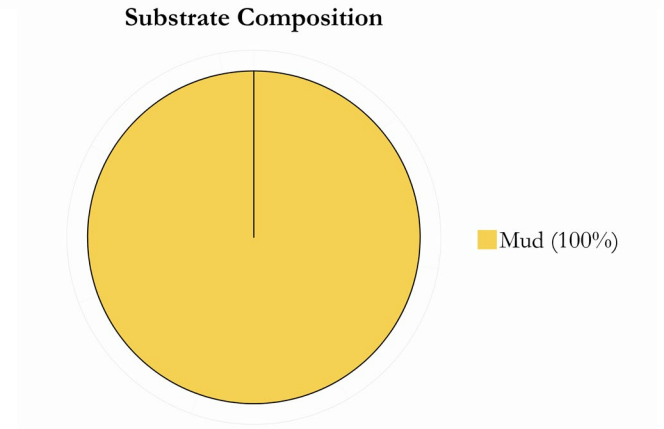
Summary - description of transect

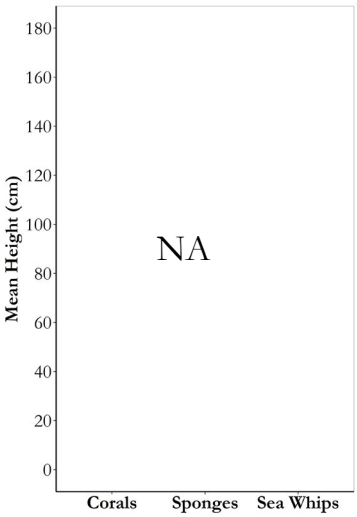
Transect 163: Primary and secondary substrates consisted entirely of mud. Overall fish and crab density was 0.04 individuals/m^2. Popeye grenadiers accounted for 73% of the observed individuals. No vertical habitat was observed.

Area: Pribilof Canyon to Zhemchug Canyon					Transect 164
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/26/14	57.11	-173.96	681	766	3.2









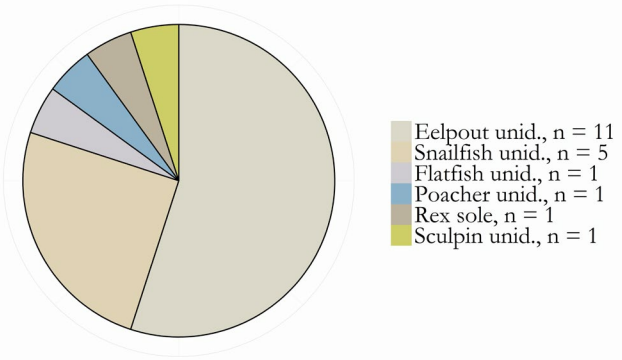
Images

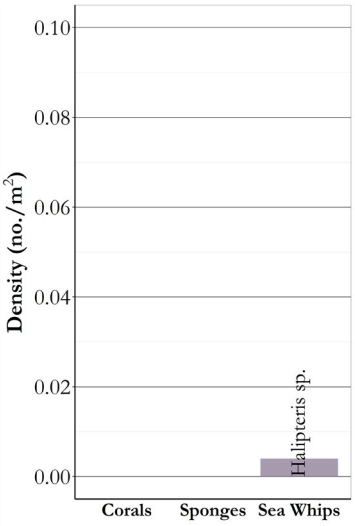
Summary - description of transect

Transect 164: Primary and secondary substrates consisted entirely of mud. Overall fish and crab density was high at 0.35 individuals/m^2. Popeye grenadiers accounted for 62% of the enumerated taxa. The next most abundant taxa were eelpouts at 11%. No vertical habitat was observed.

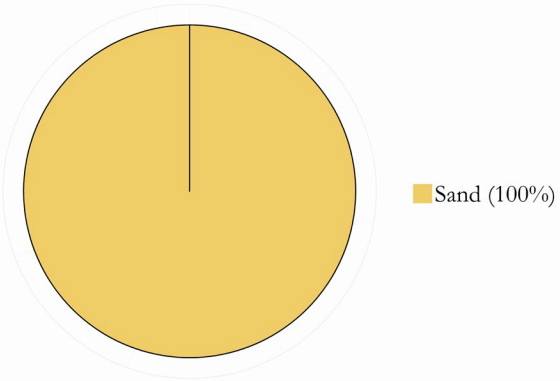
Area: Pribilof Canyon to Zhemchug Canyon					Transect 165
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/26/14	57.24	-173.94	686	491	3.7

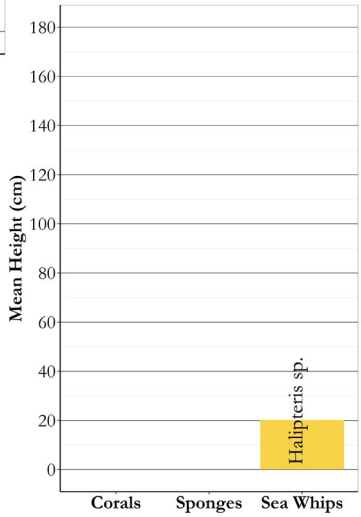
Fish and Crab Composition (n = 20)



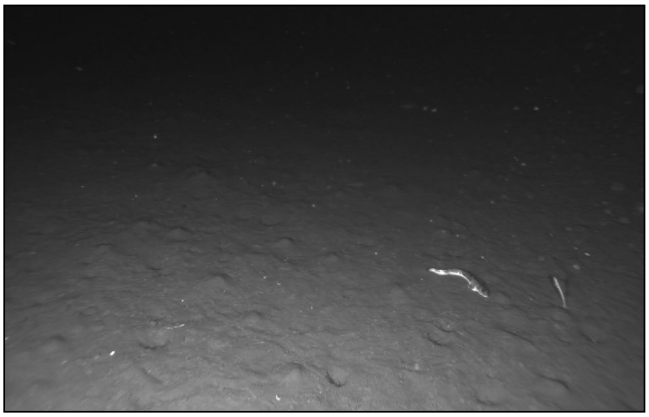


Substrate Composition





Images

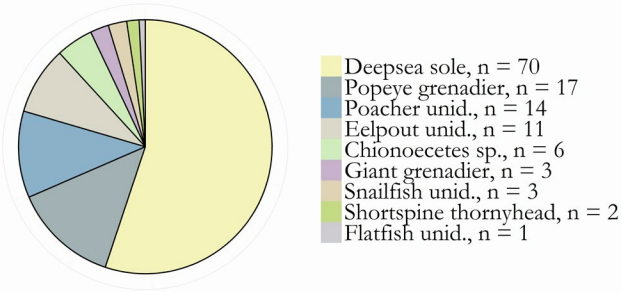


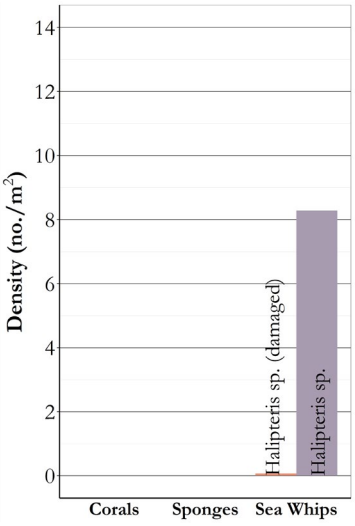
Summary - description of transect

Transect 165: Primary and secondary substrates consisted entirely of sand. Overall fish and crab density was 0.03 individuals/m^2. Eelpouts accounted for 55% of the enumerated taxa. The next most abundant taxa were snailfishes at 25%. Vertical habitat consisted of 3 sea whips, with a density of < 0.01 individuals/m^2. Sea whip heights ($n = 3$) ranged from 12.8 cm to 32.3 cm with a mean of 20.2 cm. No other corals or sponges were observed.

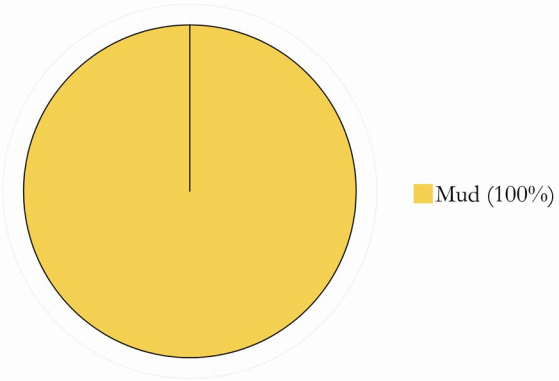
Area: Pribilof Canyon to Zhemchug Canyon					Transect 166
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/26/14	57.26	-173.98	464	719	3.2

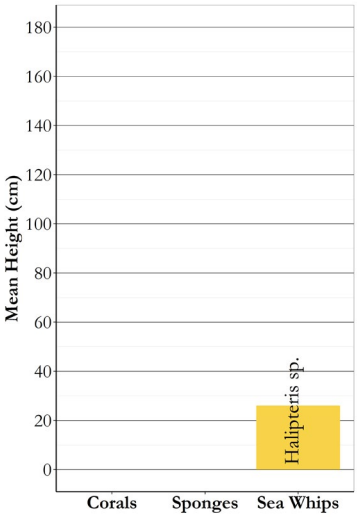
Fish and Crab Composition (n = 127)



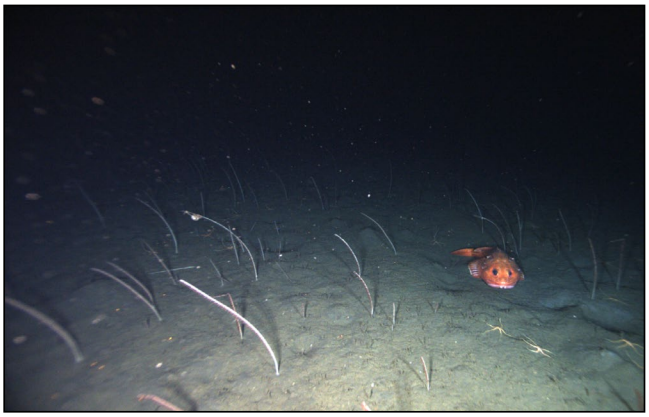


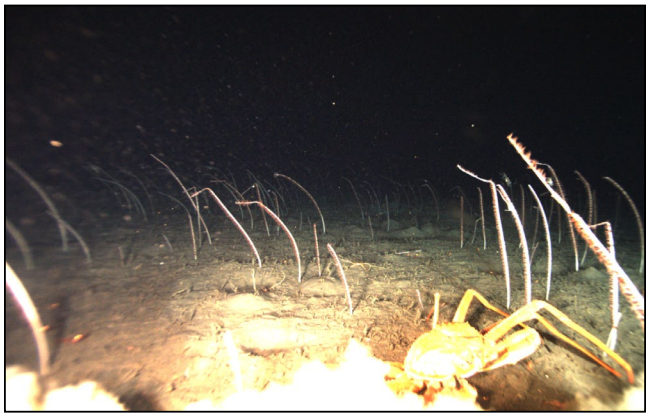
Substrate Composition





Images



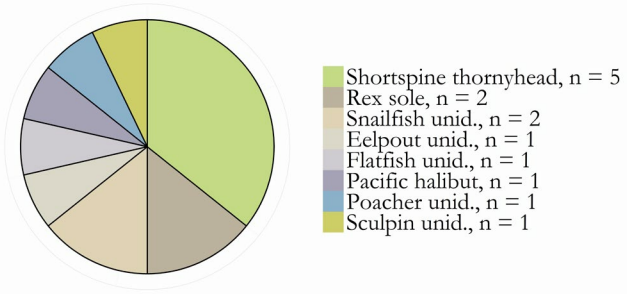


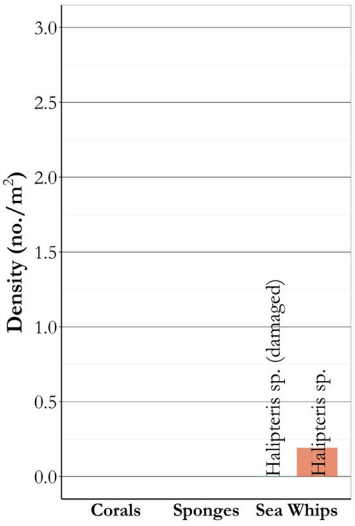
Summary - description of transect

Transect 166: Primary and secondary substrates consisted entirely of mud. Overall fish and crab density was 0.27 individuals/m^2. Deepsea sole accounted for 55% of the enumerated taxa. The next most abundant taxa were popeye grenadiers (13%) and poachers (11%). Vertical habitat consisted of 3,872 sea whips (31) damaged, with a density of 8.35 individuals/m^2. Sea whip heights (n = 195) ranged from 5.1 cm to 49.4 cm with a mean of 26.1 cm. No other corals or sponges were observed.

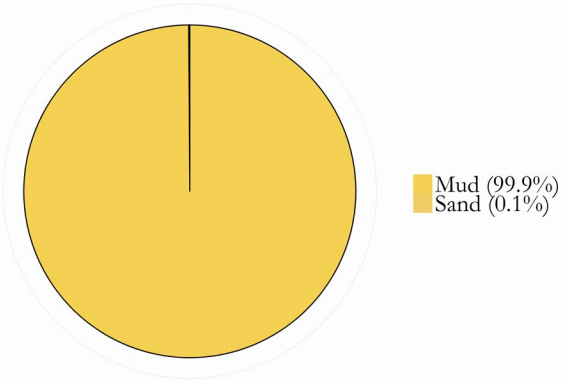
Area: Pribilof Canyon to Zhemchug Canyon					Transect 167
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/27/14	57.28	-173.88	583	367	3.8

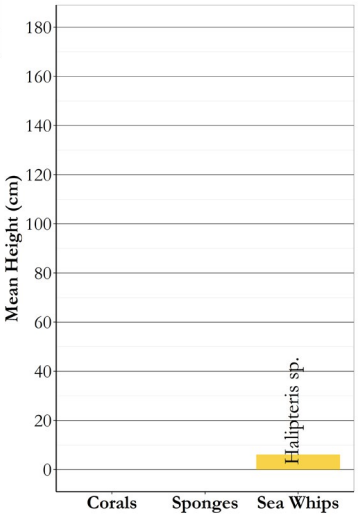
Fish and Crab Composition (n = 14)



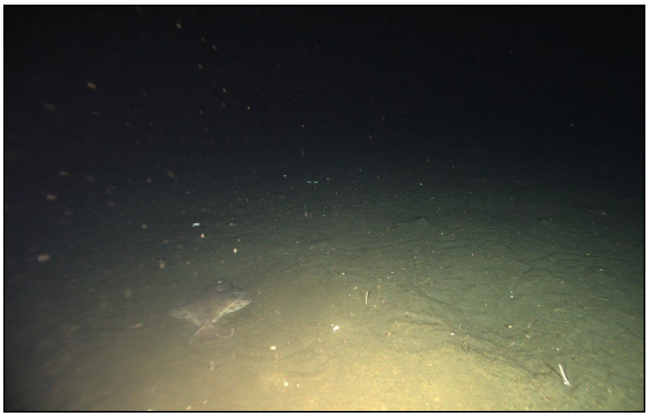


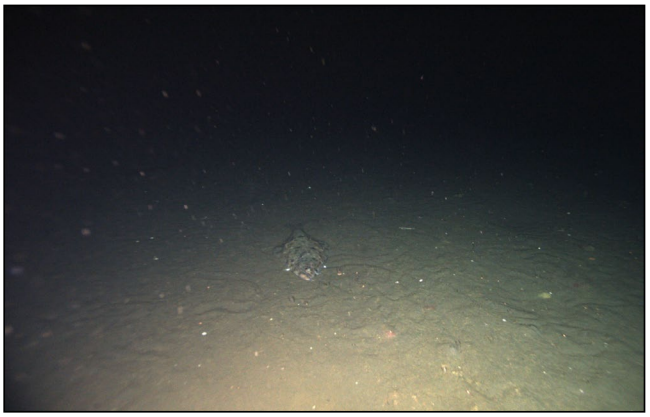
Substrate Composition





Images

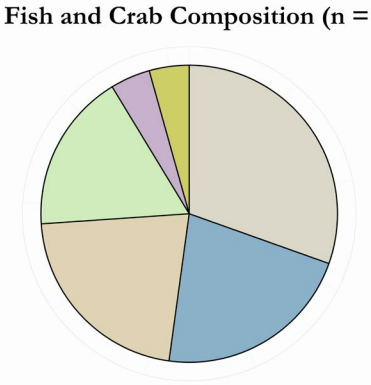


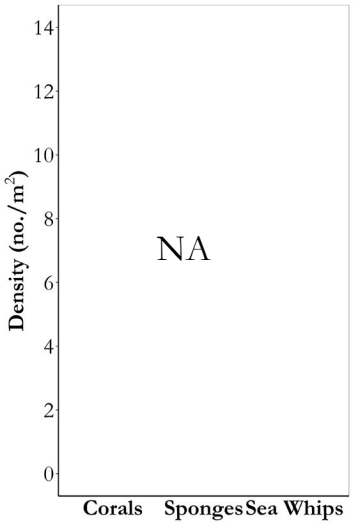


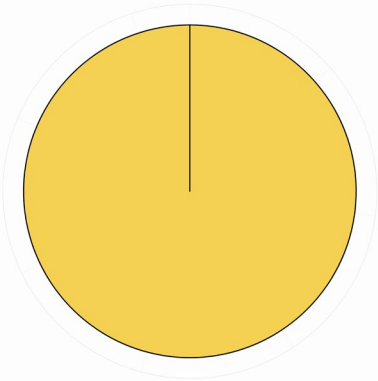
Summary - description of transect

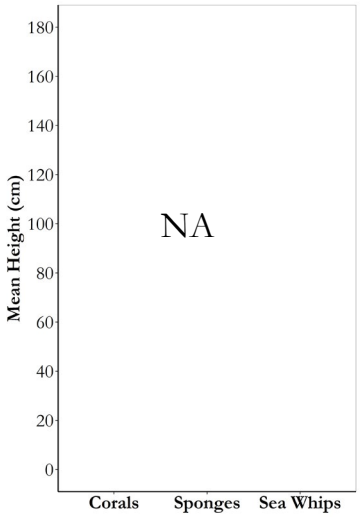
Transect 167: Primary and secondary substrates consisted almost entirely of mud. Overall fish density was 0.02 individuals/m^2. Shortspine thornyheads accounted for 36% of the enumerated taxa. The next most abundant taxa were rex sole (14%) and snailfishes (14%). Vertical habitat consisted of 114 sea whips (2 damaged), with a density of 0.20 individuals/m^2. Sea whip heights ($n = 68$) ranged from 2.3 cm to 10.1 cm with a mean of 3.1 cm. No other corals or sponges were observed.

Area: Pribilof Canyon to Zhemchug Canyon					Transect 168
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/27/14	57.28	-173.93	772	591	3.5

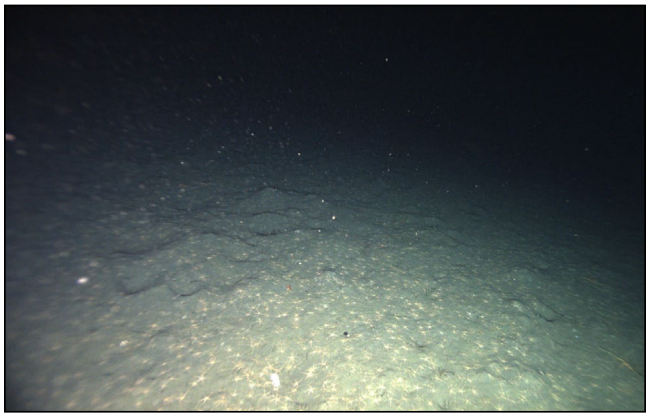








Images



Summary - description of transect

Transect 168: Primary and secondary substrates consisted entirely of mud. Overall fish and crab density was 0.03 individuals/m^2. Eelpouts accounted for 30% of the enumerated taxa. The next most abundant taxa were poachers, snailfishes, and *Chionoecetes* sp., at 61% combined. No vertical habitat consisted was observed.

Zhemchug Canyon

Twenty-five transects were completed in Zhemchug Canyon. Depths ranged from 121 m to 744 m. Thirty-one taxa of fishes and crabs were identified (Table 22). Vertical habitat was dominated by sponges (Table 23). Heights ranged from 1.7 cm to 134.5 cm (Table 24).

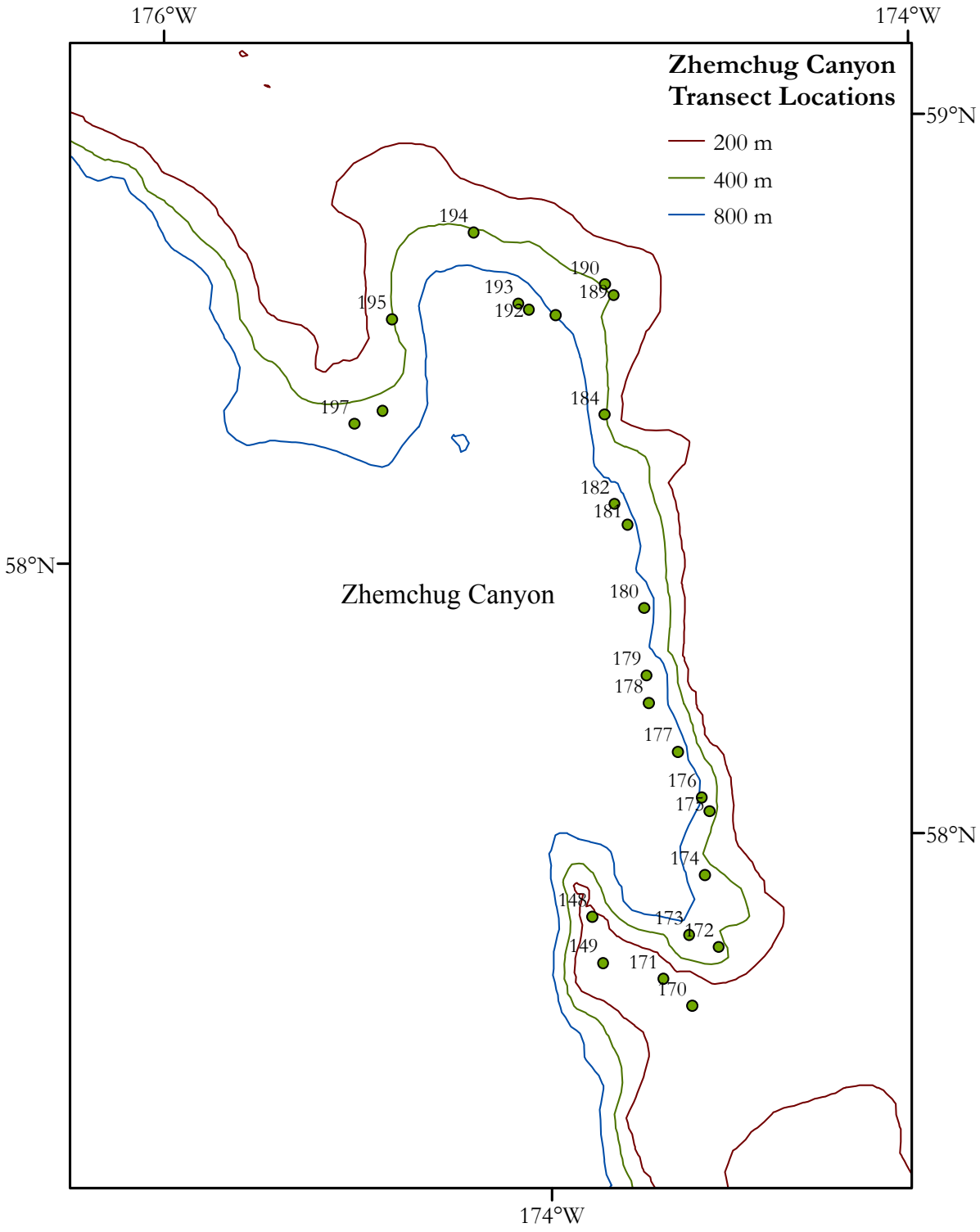


Figure 18. -- Survey transect locations, Zhemchug Canyon.

SITE SUMMARY: Zhemchug Canyon

Zhemchug Canyon is known for its rugged steep walls. The elongated canyon runs almost parallel to the shelf break. It cuts a gorge 106 km long and 30 km wide, with 2,600 m of relief and a floor 10 km wide (Karl et al. 1996).

Twenty-three distinct substrates were identified in Zhemchug Canyon (Table 21). The primary substrate was sand with mud, gravel, cobble, boulders, mixed coarse, and bedrock mixed in. Transect 149 was the most diverse in the canyon with 13 different substrates being identified and boulders comprising 48% of the composition.

Fish and crab composition was also diverse with thirty-one taxa being identified (Table 22). Pacific ocean perch ($n = 846$) and harlequin rockfish ($n = 11$) were the most abundant, of which 813 were identified at transect 149. Northern rockfish ($n = 167$) were also present at this transect.

Demospongiae ($n = 9,294$) from transect 149 were the most abundant of the corals, sponges, and sea whips (Table 23). Heights ranged from 1.7 cm to 134.5 cm with *Halipteris* being the shortest and Demospongiae being the tallest (Table 24). *Swiftia* sp. was the only coral observed other than *Halipteris*

Sea whips and Demospongiae were distributed throughout the canyon (Figs. 19, 21). The one Plexauridae (*Swiftia* sp.) was located in the southern tip of the canyon (Fig. 20).

Table 21. -- Summary of substrates observed at transects ($n = 25$) in Zhemchug Canyon.

Substrate	Depth range (m)	Number of transects with observed substrate	Percent of observations
Sand.mud	153 - 744	18	64%
Sand*	288 - 659	5	12%
Sand.gravel	122 - 485	7	10%
Sand.mixed coarse	288 - 744	3	4%
Sand.cobble	121 - 130	3	3%
Boulder.high bedrock	129 - 129	1	2%
Mixed coarse	121 - 121	2	1%
Cobble.sand	129 - 129	1	1%
Sand.boulder	121 - 121	8	1%
Gravel.sand	129 - 129	2	<1%
High bedrock.boulder	121 - 129	1	<1%
Gravel*	129 - 129	1	<1%
Low bedrock.boulder	121 - 121	1	<1%
Boulder.low bedrock	129 - 129	1	<1%
Mixed coarse.boulder	121 - 121	1	<1%
Sand.low bedrock	288 - 288	3	<1%
Cobble.low bedrock	129 - 129	1	<1%
Boulder.sand	129 - 129	2	<1%
High bedrock	121 - 121	1	<1%
Sand.high bedrock	485 - 485	1	<1%
Cobble.boulder	129 - 129	1	<1%
Mixed coarse.sand	121 - 121	1	<1%
Low bedrock	121 - 121	1	<1%

*Primary and secondary substrates were the same.

Table 22. -- Summary of fishes and crabs identified at transects (n = 25) in Zhemchug Canyon.

Species/Grouping	Number of occurrences	Number of transects with occurrences	Mean transect depth range (m)	Mean density (individuals/m^2)
Pacific ocean perch	846	6	121 - 402	0.10
Eelpout unid.	168	16	251 - 744	0.01
Northern rockfish	168	2	121 - 288	0.06
Poacher unid.	115	21	129 - 744	0.01
Popeye grenadier	84	4	659 - 737	0.02
Sculpin unid.	69	17	121 - 677	0.01
Rockfish unid.	60	8	121 - 582	0.01
Searcher unid.	52	1	121 - 121	0.04
Giant grenadier	51	11	422 - 744	<0.01
Flatfish unid.	36	12	121 - 737	<0.01
Snailfish unid.	35	10	236 - 744	<0.01
Roundfish unid.	31	16	121 - 744	<0.01
Shortspine thornyhead	27	9	363 - 737	<0.01
Shortraker rockfish	18	5	347 - 563	<0.01
Chionoecetes sp.	17	10	153 - 701	<0.01
Skate unid.	11	8	251 - 582	<0.01
Harlequin rockfish	11	1	121 - 121	0.01
Arrowtooth/Kamchatka flounder	10	7	251 - 677	<0.01
Crab unid.	8	4	122 - 485	<0.01
Walleye pollock	4	2	121 - 363	<0.01
Rex sole	3	2	422 - 427	<0.01
Flathead sole	3	1	485 - 485	<0.01
Greenland turbot	3	1	468 - 468	<0.01
Pacific cod	3	3	121 - 288	<0.01
Grenadier unid.	2	2	468 - 677	<0.01
Blackspotted rockfish	2	2	121 - 347	<0.01
King crab unid.	2	2	236 - 701	<0.01
Golden king crab	2	2	241 - 402	<0.01
Pacific halibut	1	1	122 - 122	<0.01
Dusky rockfish	1	1	121 - 121	<0.01
Atka mackerel	1	1	121 - 121	<0.01

Table 23. -- Summary of coral, sponge, and sea whip taxa identified at transects (n = 25) in Zhemchug Canyon.

Species/Grouping	Number of occurrences	Number of transects with occurrences	Mean transect depth range (m)	Mean density (individuals/m^2)
Demospongiae	9,495	10	121 - 737	0.69
Halipteris sp.	583	11	236 - 744	0.05
Hexactinellida	195	8	121 - 677	0.05
Halipteris sp. (damaged)	8	3	288 - 479	<0.01
Porifera	6	1	677 - 677	0.01
Swiftia sp.	2	1	402 - 402	<0.01

**Halipteris* sp. (damaged) is not accounted for in the *Halipteris* sp. grouping.

Table 24. -- Summary of coral, sponge, and sea whip mean height from transects completed in Zhemchug Canyon.

Species/Grouping	Number measured	Mean height (cm)	Minimum height (cm)	Maximum height (cm)
Demospongiae	281	22.9	10.1	134.5
Halipteris sp.	154	6.3	1.7	28.2
Halipteris willemoesi	12	38.4	11.7	103.4
Hexactinellida	61	20.5	10.4	78.2
Porifera	1	21.8	21.8	21.8
Swiftia sp.	1	14.7	14.7	14.7

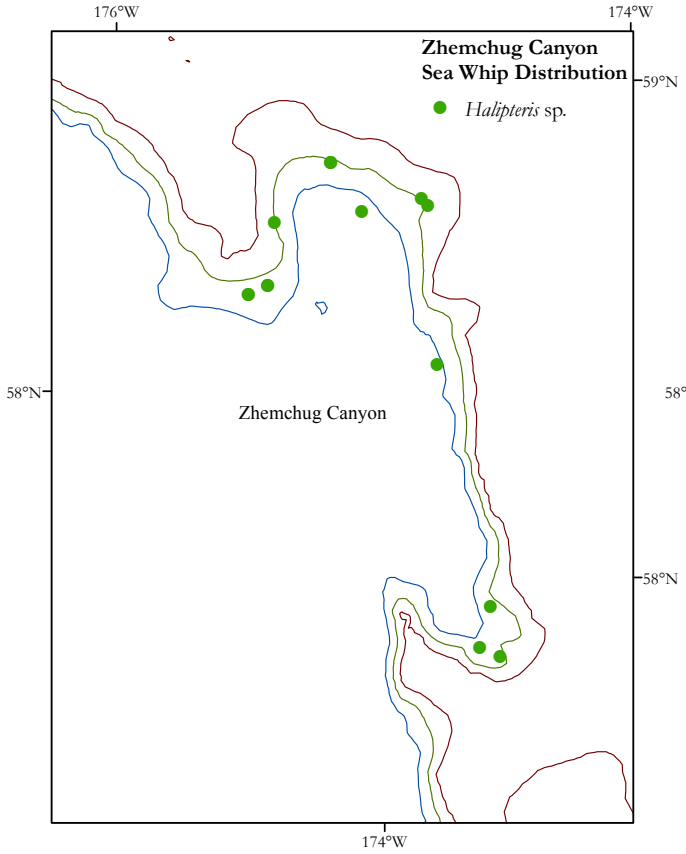


Figure 19. -- Sea whip distribution, Zhemchug Canyon.

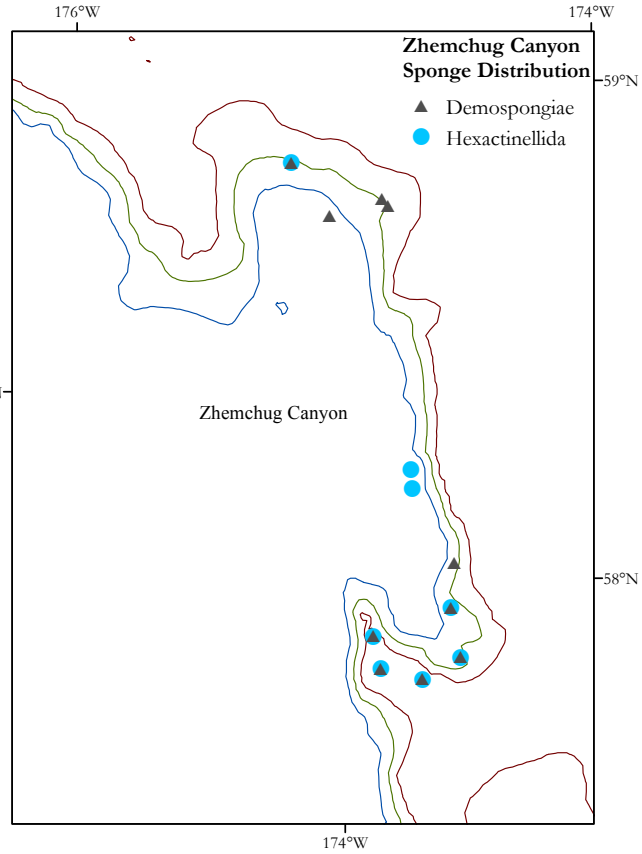


Figure 21. -- Sponge distribution, Zhemchug Canyon.

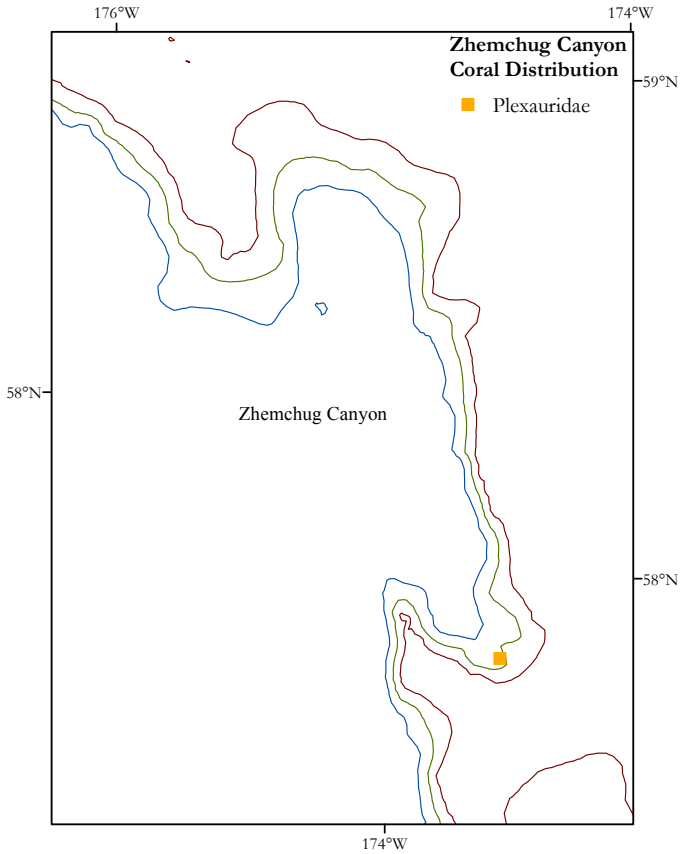
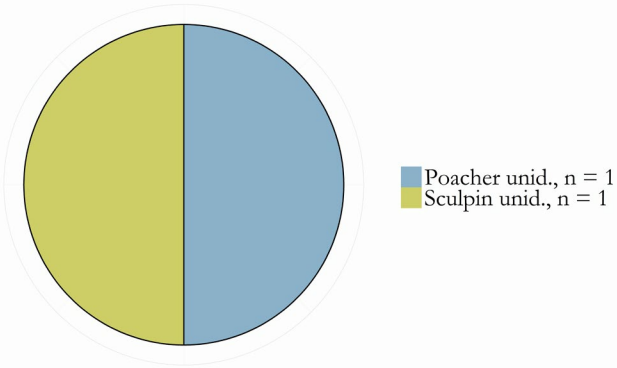
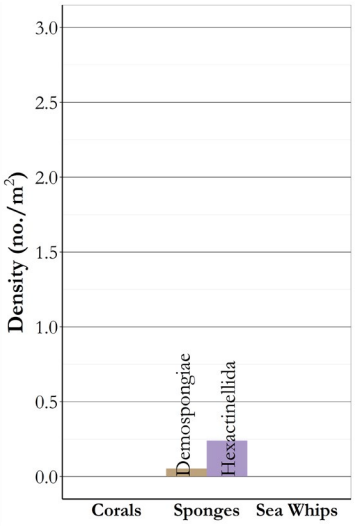


Figure 20. -- Coral distribution, Zhemchug Canyon.

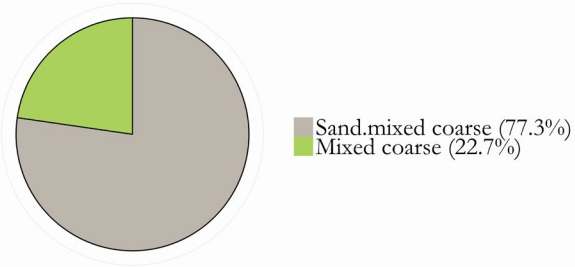
Area: Zhemchug Canyon					Transect 148
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/25/14	57.75	-174.11	375	129	4.1

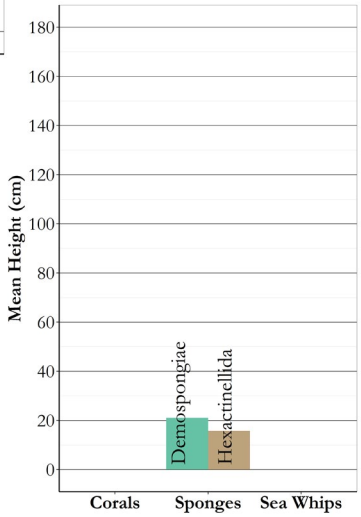
Fish and Crab Composition (n = 2)



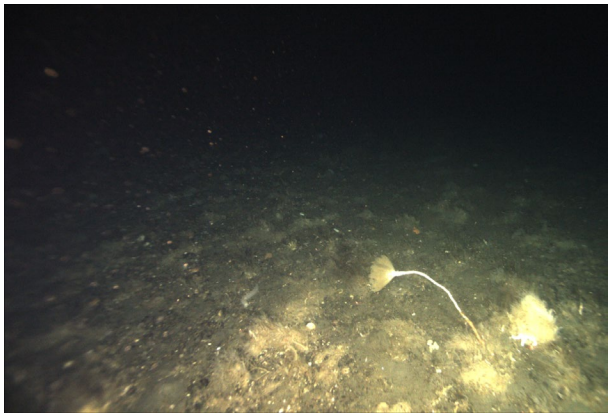


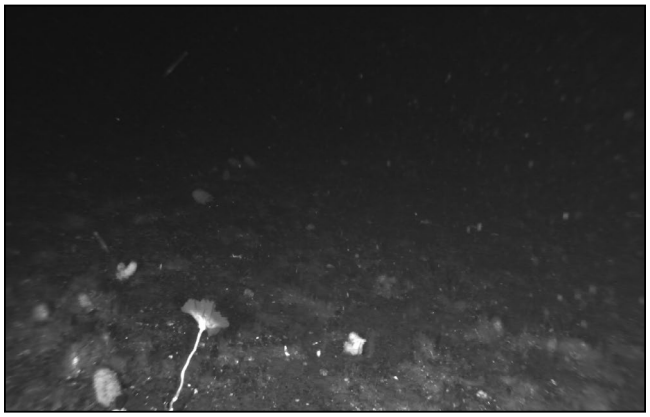
Substrate Composition





Images



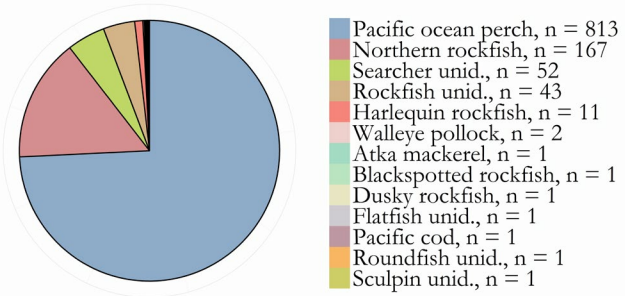


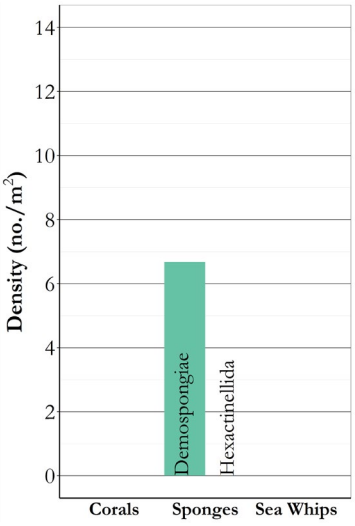
Summary - description of transect

Transect 148: Primary and secondary substrates for 75% of the transect were sand and mixed coarse. The remaining substrate consisted entirely of mixed coarse. Species density was extremely low (0.01) individuals/m^2. Only two fish were identified. Sponge densities were 0.29 individuals/m^2, with 20 Demospongiae and 90 Hexactinellida identified. One Demospongiae was measured (21.0 cm) and the mean height of 15 measured Hexactinellida was 15.7 cm. No corals were observed.

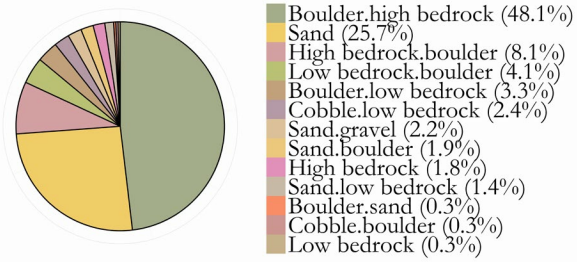
Area: Zhemchug Canyon					Transect 149
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/25/14	57.69	-174.05	1,392	121	3.9

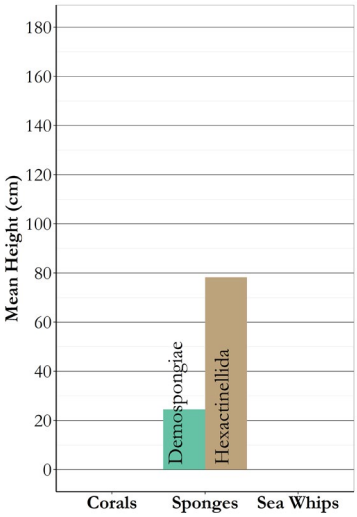
Fish and Crab Composition (n = 1095)



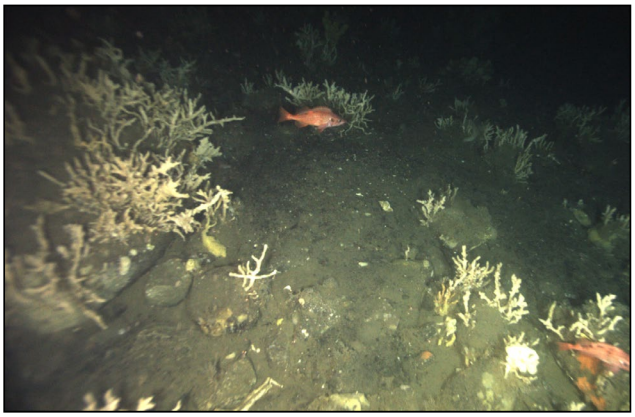


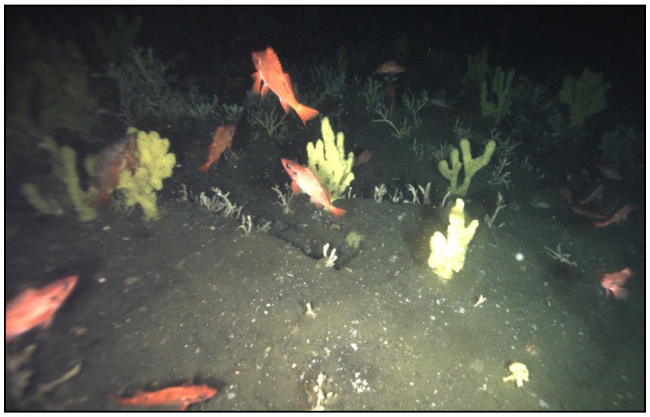
Substrate Composition





Images

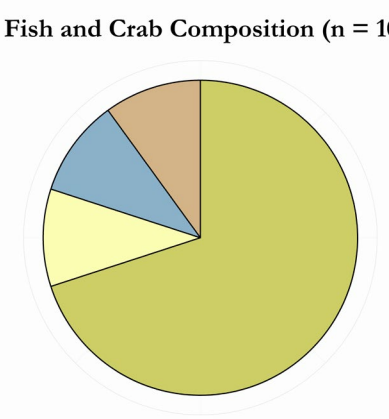


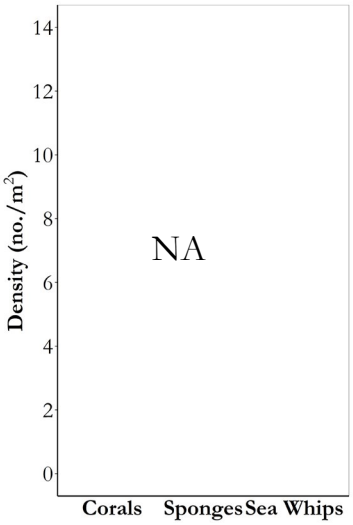


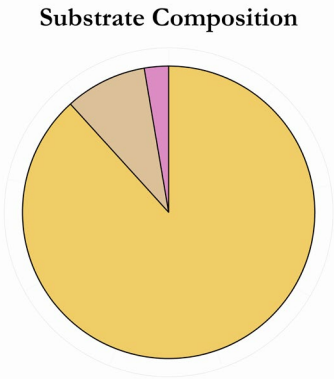
Summary - description of transect

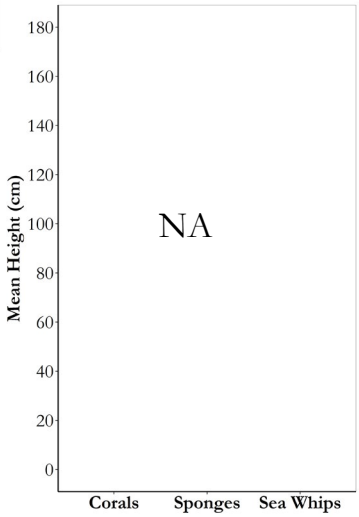
Transect 149: Substrate composition for this transect was very diverse. Almost 50% of the substrate consisted of boulder and high bedrock. Another 26% of the substrate was sand. Of the 1,095 individuals counted, 813 were Pacific ocean perch and 167 were northern rockfish, accounting for 89% of all fishes counted. Fish density was 0.79 individuals/m^2. Vertical habitat was composed of four Hexactinellida and 9,294 Demospongiae for a density of 6.678 individuals/m^2. Mean height for 233 measured Demospongiae was 24.5 cm. One Hexactinellida was measured (78.2 cm). No corals were identified.

Area: Zhemchug Canyon					Transect 170
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/27/14	57.67	-173.78	436	130	3.7

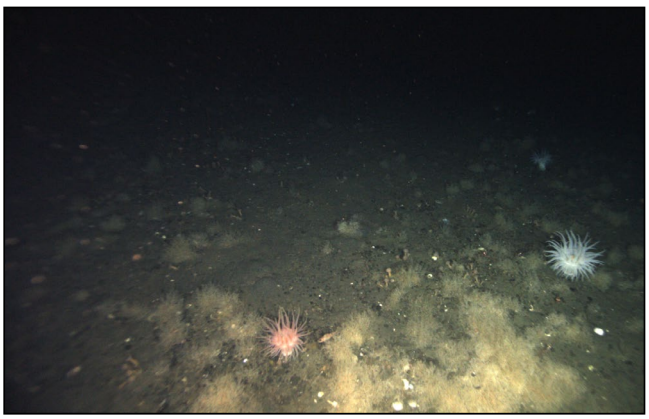


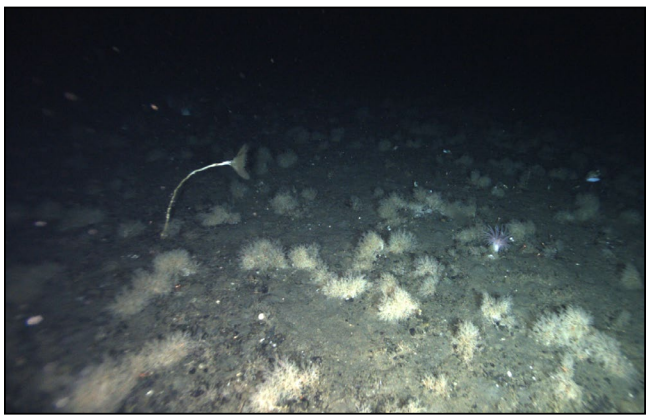






Images



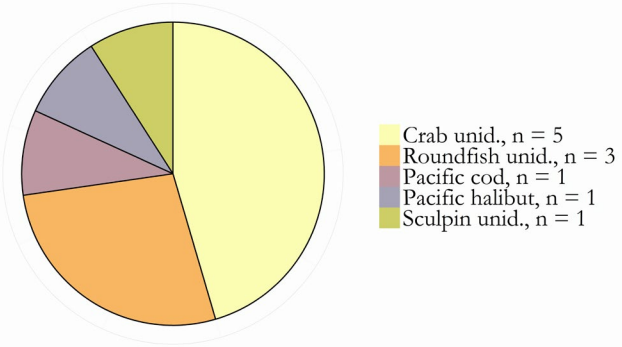


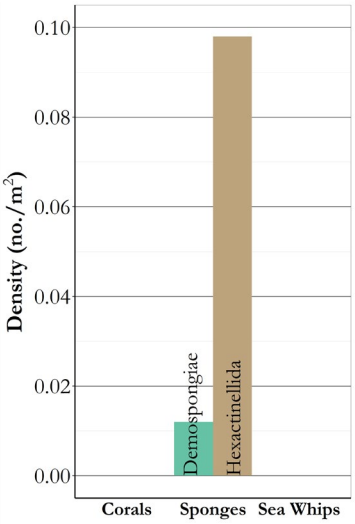
Summary - description of transect

Transect 170: Primary and secondary substrates consisted almost entirely of sand, with < 10% a sand/gravel mix. Fish and crab density for this transect was 0.02 individuals/m^2, and 70% of individuals identified were sculpins. No vertical habitat was identified.

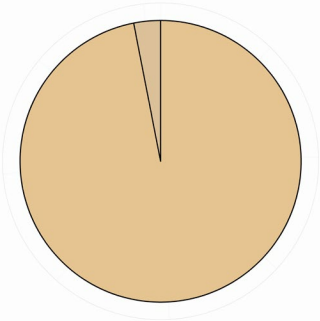
Area: Zhemchug Canyon					Transect 171
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/27/14	57.69	-173.88	727	122	4.0

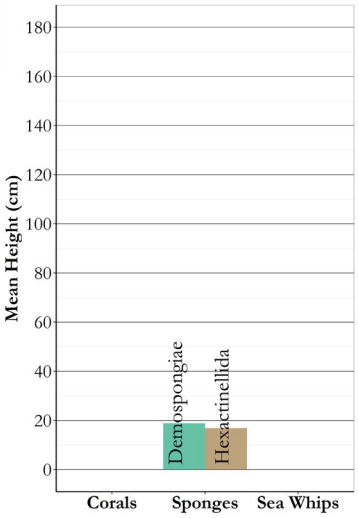
Fish and Crab Composition (n = 11)



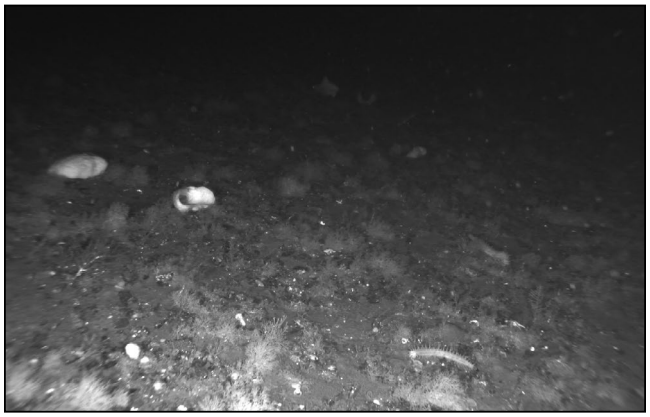


Substrate Composition





Images

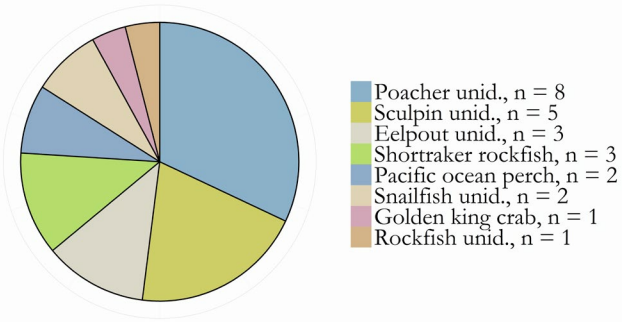


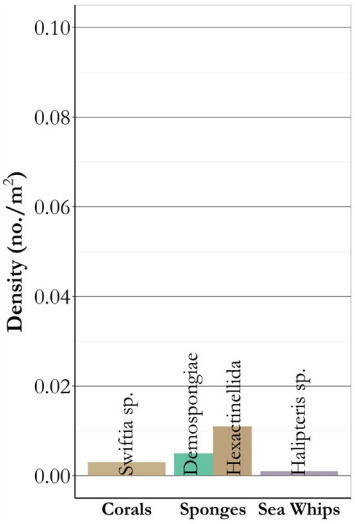
Summary - description of transect

Transect 171: Primary and secondary substrates consisted of sand and cobble. Fish and crab density for this transect was low (0.02 individuals/m^2), and consisted largely of crabs and unidentified roundfishes. Vertical habitat consisted of 80 sponges (9 Demospongiae, 71 Hexactinellida). Sponge density was 0.11 individuals/m^2. Mean height for 6 measured Demospongiae was 18.9 cm, while the mean height for 31 measured Hexactinellida was 16.9 cm. No corals were identified.

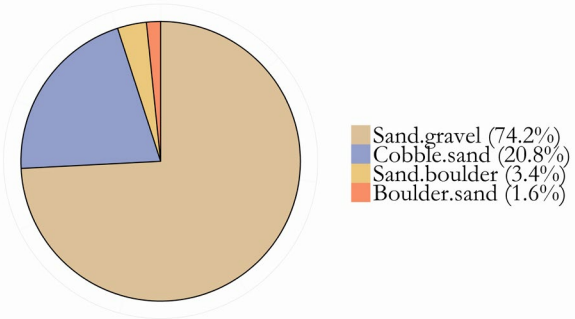
Area: Zhemchug Canyon					Transect 172
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/27/14	57.76	-173.76	794	402	3.8

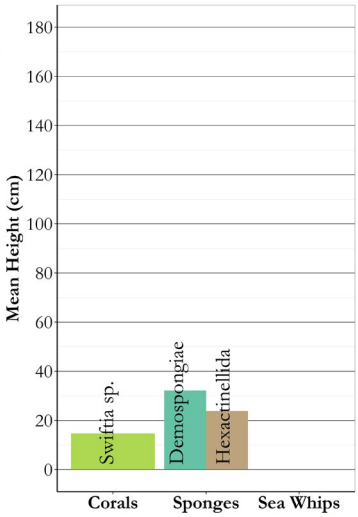
Fish and Crab Composition (n = 25)





Substrate Composition





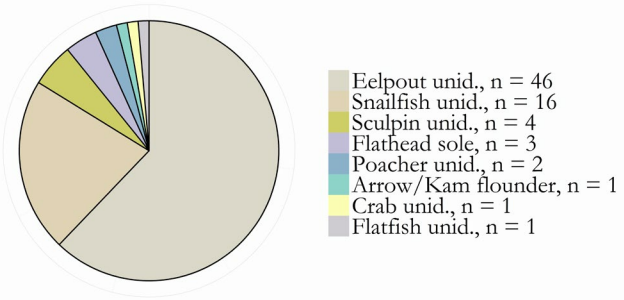
Images

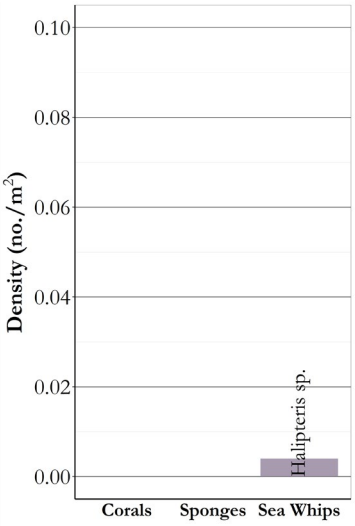
Summary - description of transect

Transect 172: Primary and secondary substrates for 75% of the transect were sand and gravel. A cobble/sand sediment mix comprised another ~20% of the substrate identified. Of the 25 individuals counted, 32% were poachers and 20% were sculpins. Species density was 0.03 individuals/m^2. Vertical habitat consisted of 2 corals (*Swiftia* sp.), 1 sea whip, and 13 sponges (4 Demospongiae, 9 Hexactinellida). Vertical habitat density was 0.02 individuals/m^2. Mean heights of four Demospongiae and seven Hexactinellida were 32.1 cm and 23.8 cm, respectively. One *Swiftia* sp. was measured (14.7 cm).

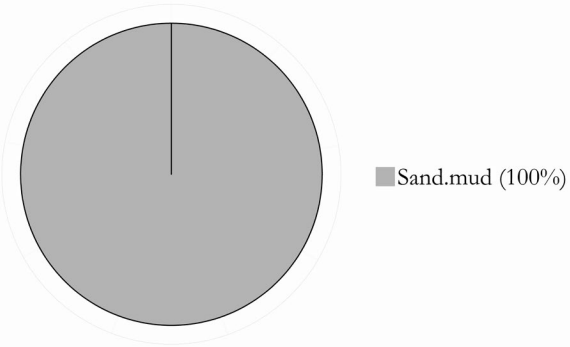
Area: Zhemchug Canyon					Transect 173
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/27/14	57.76	-173.85	684	485	3.7

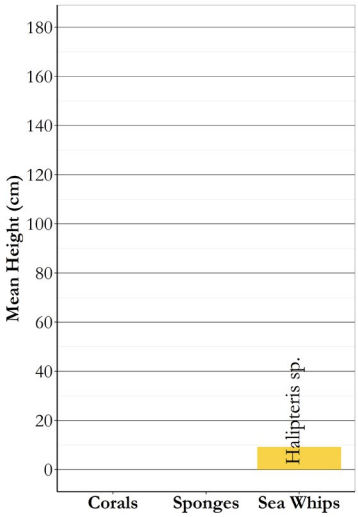
Fish and Crab Composition (n = 74)





Substrate Composition





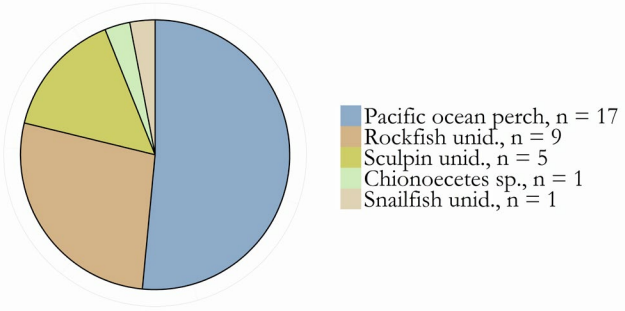
Images

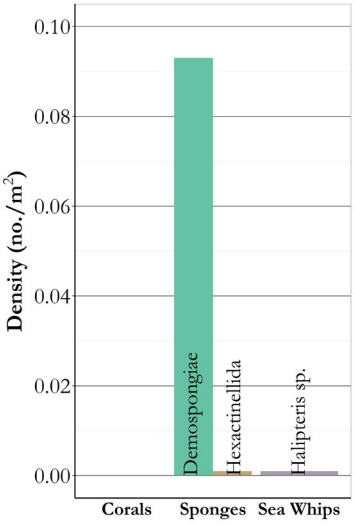
Summary - description of transect

Transect 173: Primary and secondary substrates consisted of sand and mud. Of the 74 individuals counted, 62% were eelpouts, and another 22% were snailfishes. Species density was 0.11 individuals/m^2. Vertical habitat consisted of 3 sea whips. Mean height for 2 of those sea whips was 9.3 cm. No other corals or sponges were identified.

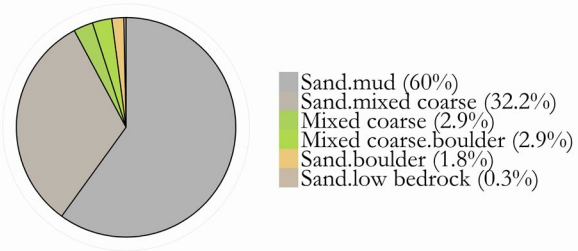
Area: Zhemchug Canyon					Transect 174
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/27/14	57.85	-173.85	964	272	3.8

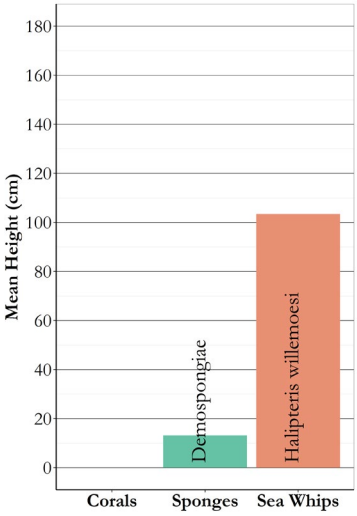
Fish and Crab Composition (n = 33)



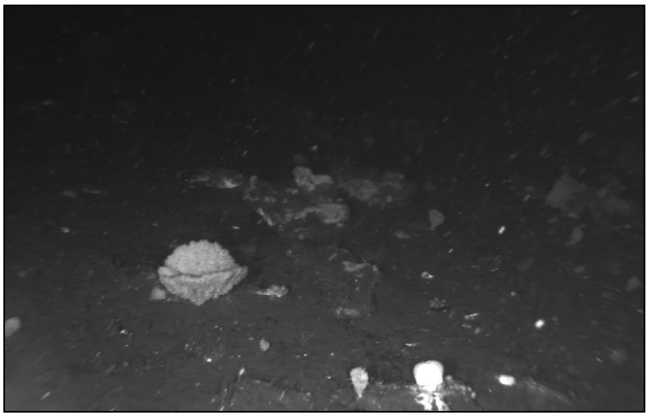


Substrate Composition





Images

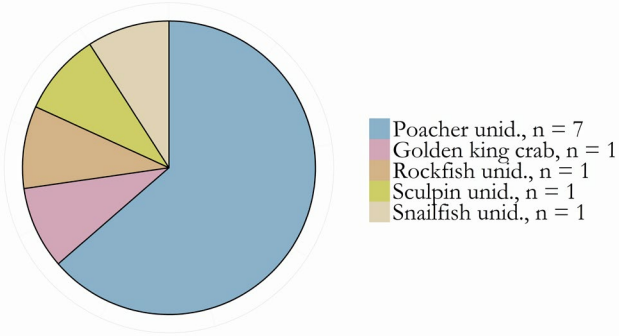


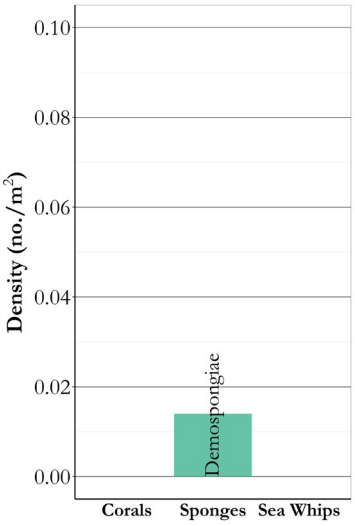
Summary - description of transect

Transect 174: Primary and secondary substrates for over half of the transect were sand and mud. The remainder of the tow consisted of a mixture of sand, mixed coarse, boulder, and low bedrock. Of the 33 individuals counted, 52% were Pacific ocean perch, and another 27% were unidentified rockfishes. Species density was 0.03 individuals/m^2. Vertical habitat consisted of 1 sea whip, 90 Demospongiae and 1 Hexactinellida. Vertical habitat density was 0.10 individuals/m^2. Mean height for 27 Demospongiae was 13.1 cm, while the one sea whip was 103.4 cm tall.

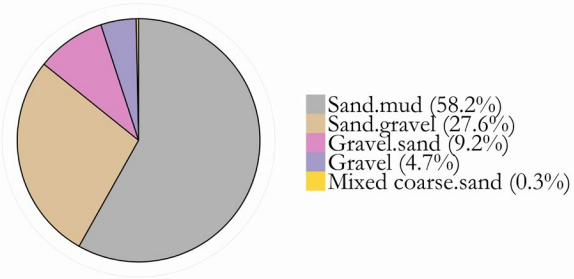
Area: Zhemchug Canyon					Transect 175
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/27/14	57.95	-173.89	655	241	3.7

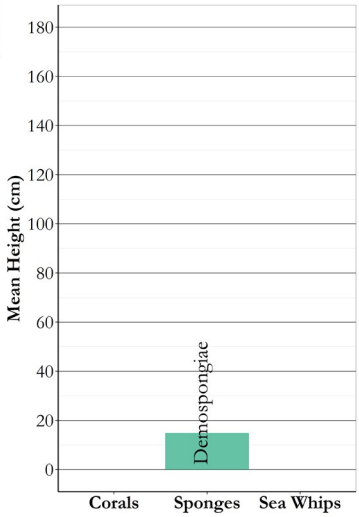
Fish and Crab Composition (n = 11)



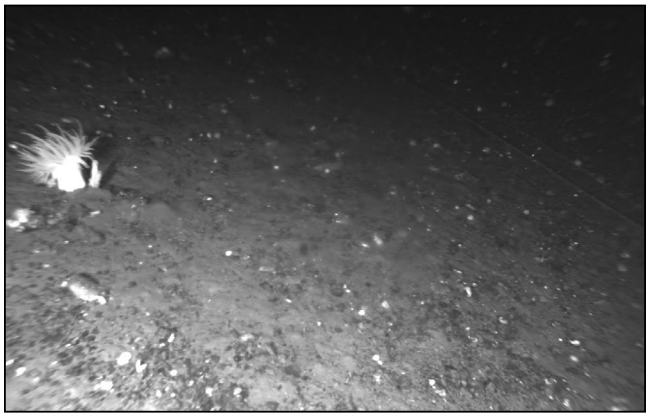


Substrate Composition





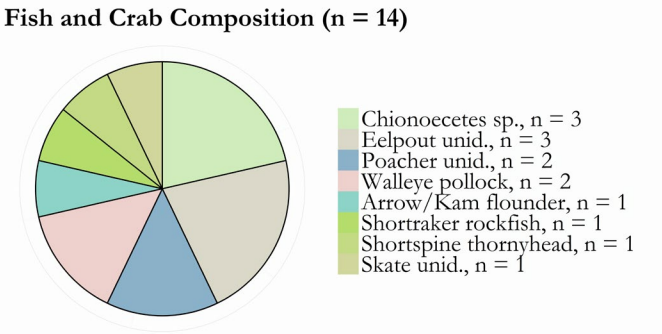
Images

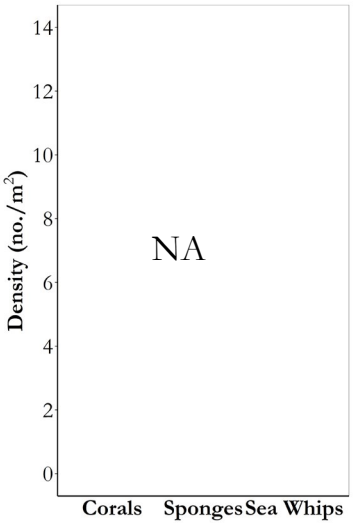


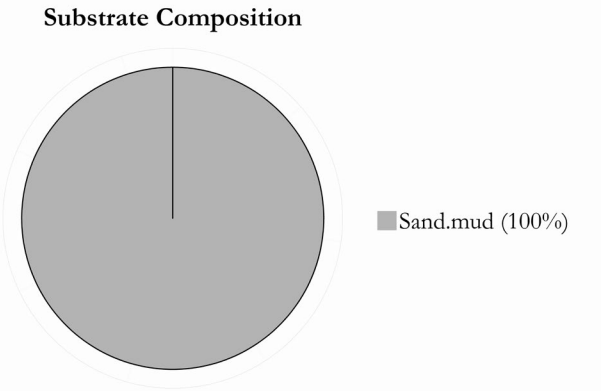
Summary - description of transect

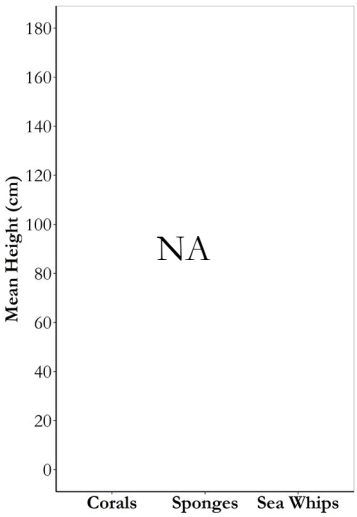
Transect 175: Primary and secondary substrates for over half of the transect were sand and mud. A sand/gravel sediment mix comprised another ~25% of the substrate identified. Only 11 individuals were counted for this transect and poachers were the most abundant. Species density was 0.02 individuals/m^2. Nine Demospongiae were identified, and 3 of them were measured (14.9 cm). Sponge density was low (0.01 individuals/m^2). No corals were identified.

Area: Zhemchug Canyon					Transect 176
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/27/14	57.96	-173.92	577	363	3.8

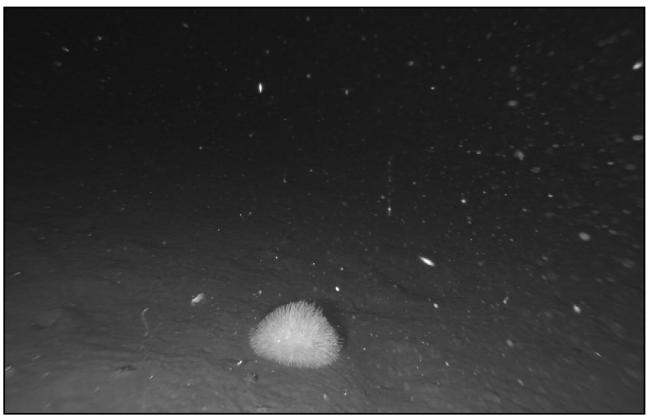


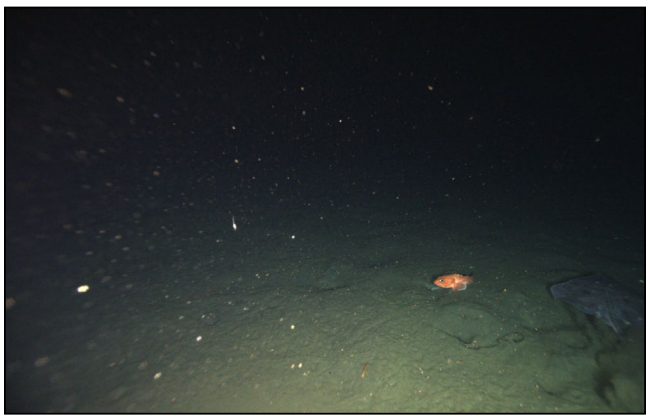






Images



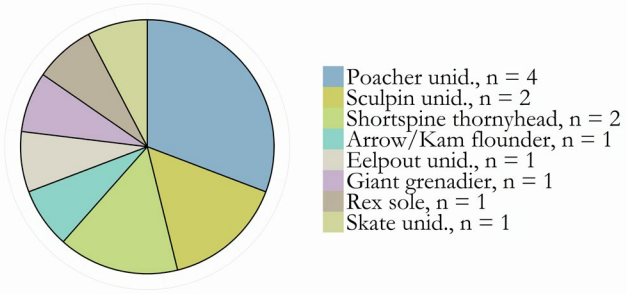


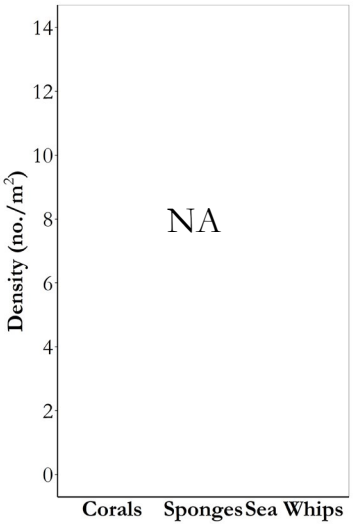
Summary - description of transect

Transect 176: Primary and secondary substrates consisted entirely of sand and mud. Only 14 individuals were counted for this transect, and counts were evenly distributed between species. Species density was 0.02 individuals/m^2. No vertical habitat was identified.

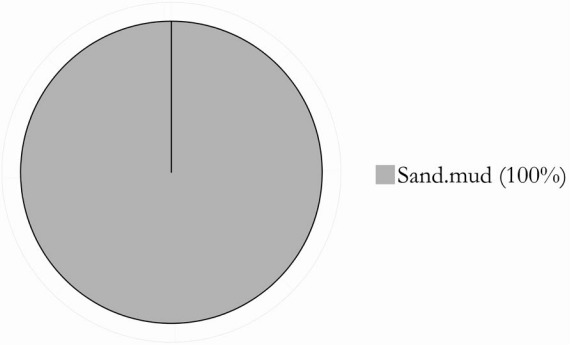
Area: Zhemchug Canyon					Transect 177
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/27/14	58.01	-174.02	685	422	3.8

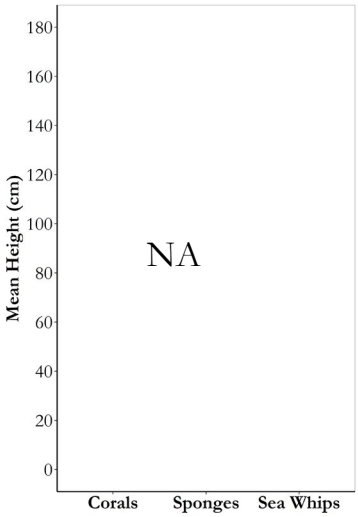
Fish and Crab Composition (n = 13)



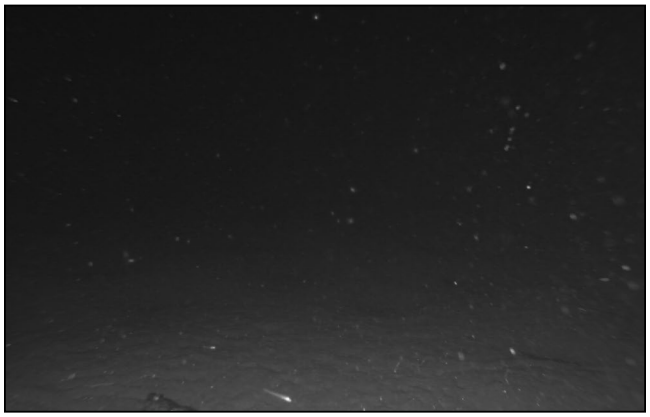


Substrate Composition





Images

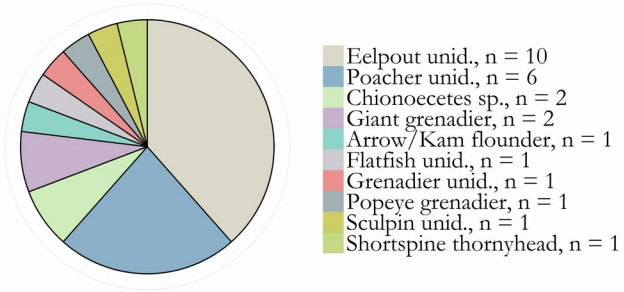


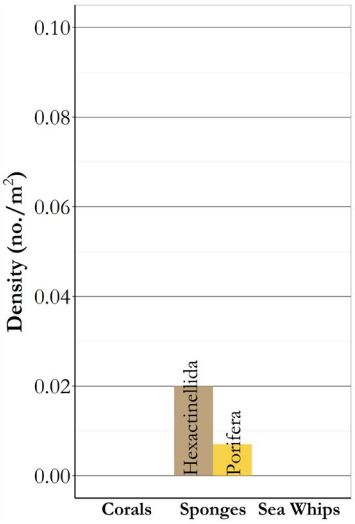
Summary - description of transect

Transect 177: Primary and secondary substrates consisted of sand and mud. Only 13 individuals were counted for this transect and poachers were the most abundant. Species density was 0.02 individuals/m^2. No vertical habitat was identified.

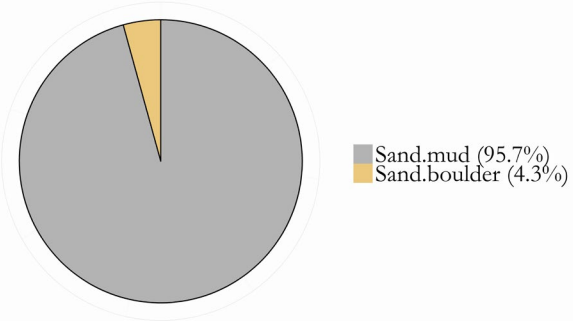
Area: Zhemchug Canyon					Transect 178
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/27/14	58.07	-174.14	900	677	3.3

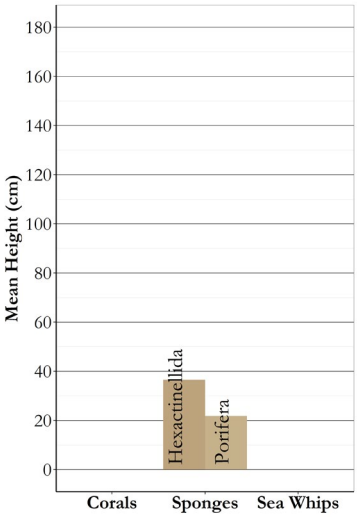
Fish and Crab Composition (n = 26)





Substrate Composition





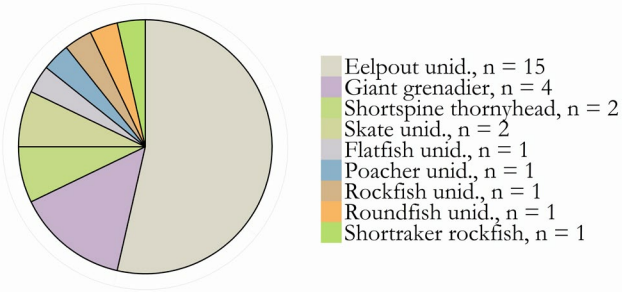
Images

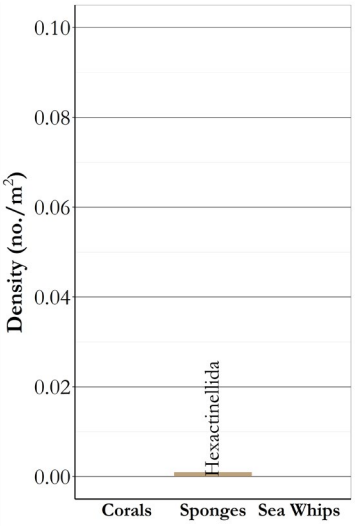
Summary - description of transect

Transect 178: Primary and secondary substrates consisted almost entirely of sand and mud, with < 5% a mix of sand/boulder. Of the 26 individuals counted, 38% were eelpouts, and another 23% were poachers. Species density was 0.03 individuals/m^2. Vertical habitat consisted of 18 Hexactinellida and 6 unidentified sponges. Sponge density was 0.03 individuals/m^2. Mean height for six Hexactinellida was 36.5 cm. One unidentified sponge was measured (21.8 cm). No corals were identified.

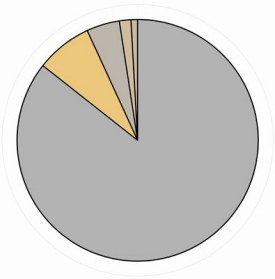
Area: Zhemchug Canyon					Transect 179
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/28/14	58.11	-174.17	846	563	3.6

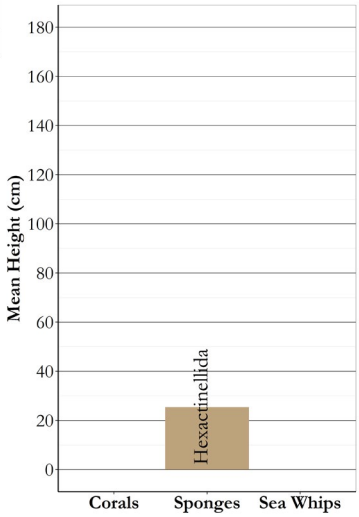
Fish and Crab Composition (n = 28)



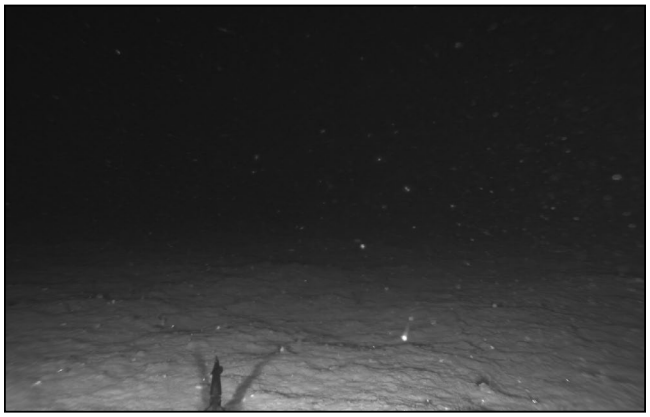


Substrate Composition





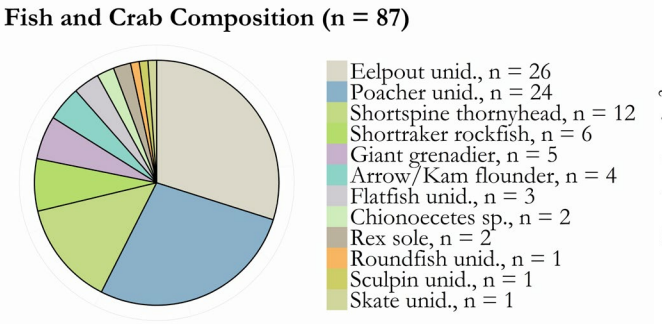
Images

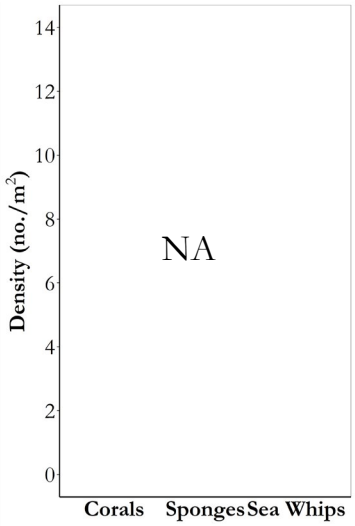


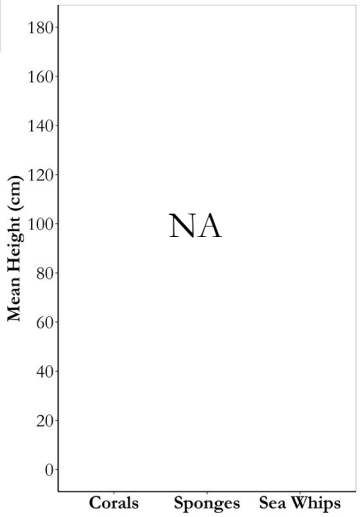
Summary - description of transect

Transect 179: Primary and secondary substrates were sand and mud. Of the 28 individuals counted, 54% were eelpouts, and another 14% were giant grenadiers. Species density was 0.03 individuals/m^2. One Hexactinellida was counted and measured (25.4 cm). No corals were identified.

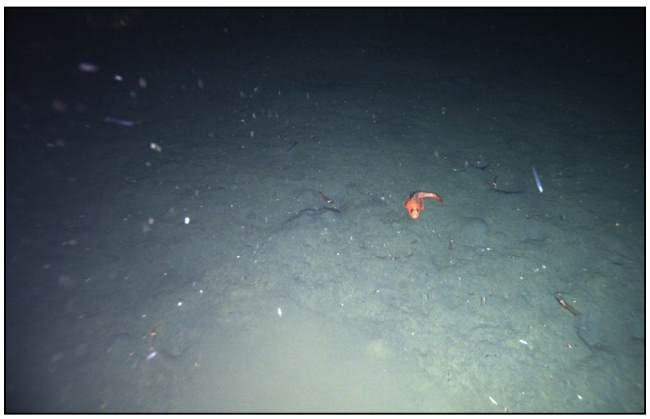
Area: Zhemchug Canyon					Transect 180
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/28/14	58.20	-174.23	1,218	427	3.8







Images

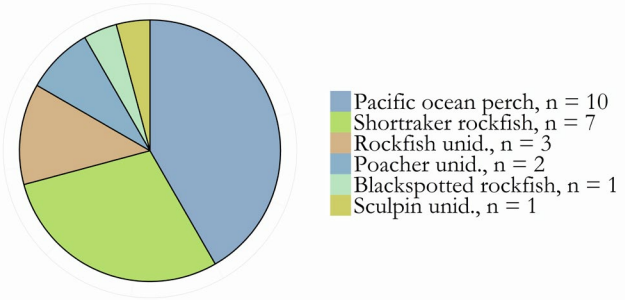


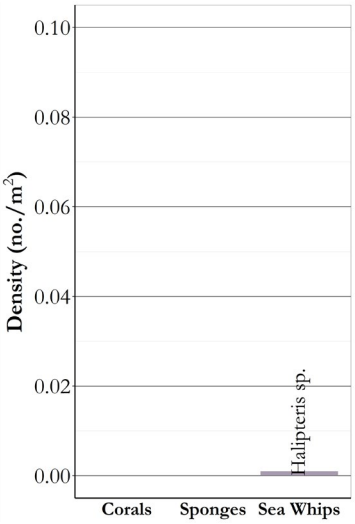
Summary - description of transect

Transect 180: Primary and secondary substrates consisted entirely of sand and mud. Of the 87 individuals counted, 30% were eelpouts, and another 28% were poachers. One skate and 4 crabs were also identified. Species density was 0.07 individuals/m^2. No vertical habitat was identified.

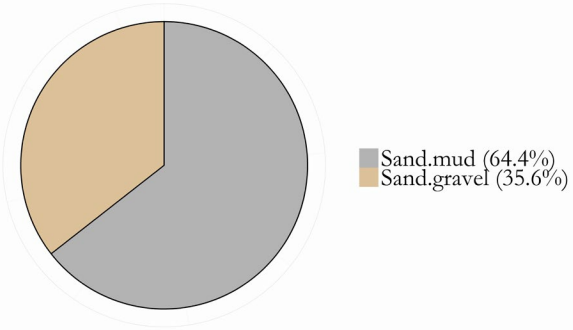
Area: Zhemchug Canyon					Transect 181
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/28/14	58.31	-174.35	1,149	347	3.9

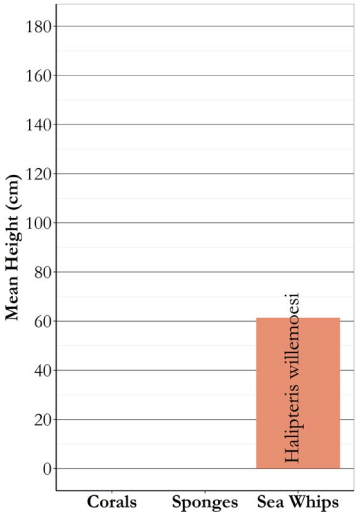
Fish and Crab Composition (n = 24)



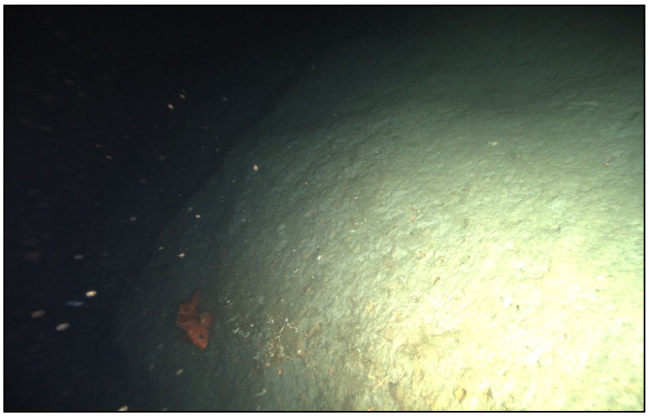


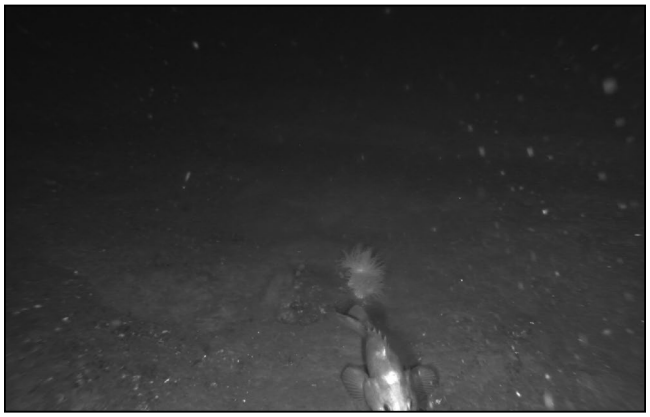
Substrate Composition





Images



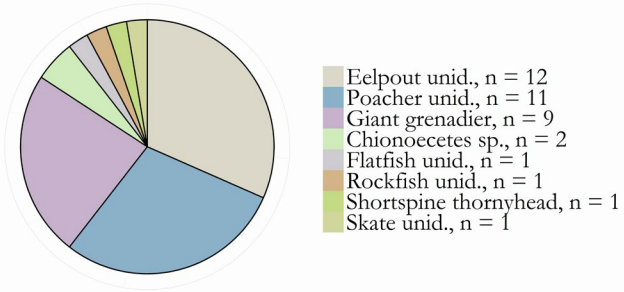


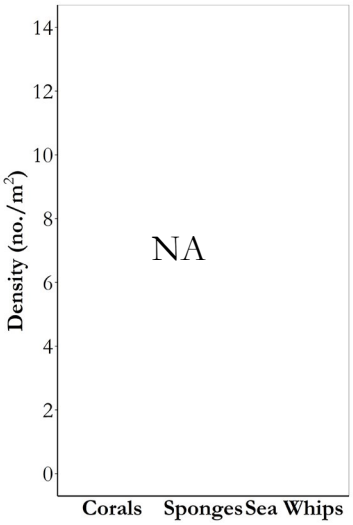
Summary - description of transect

Transect 181: Primary and secondary substrates for over half of the transect were sand and mud. A sand/gravel sediment mix comprised another ~35% of the substrate identified. Only 24 individuals were counted, and 42% were Pacific ocean perch. Shortraker rockfish comprised another 29% of the total fish count. Fish density was 0.02 individuals/m^2. One sea whip was counted and measured (61.4 cm). No other corals or sponges were identified.

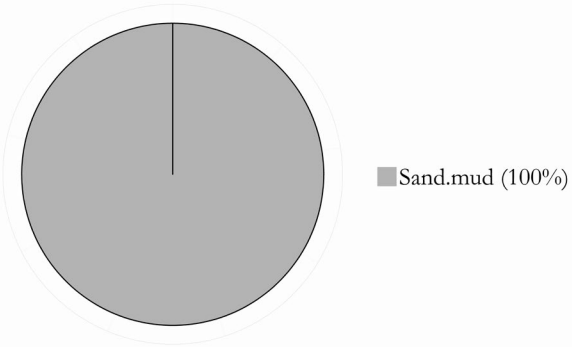
Area: Zhemchug Canyon					Transect 182
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/28/14	58.33	-174.40	987	582	3.5

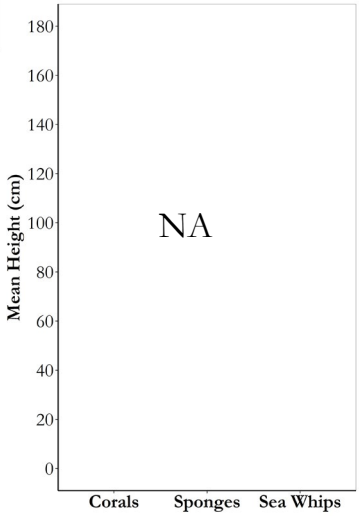
Fish and Crab Composition (n = 38)



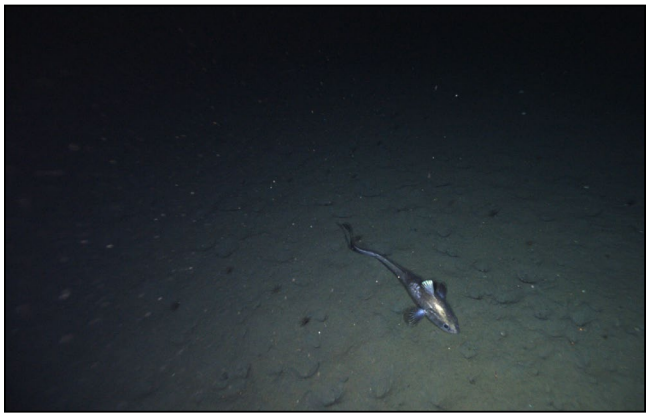


Substrate Composition





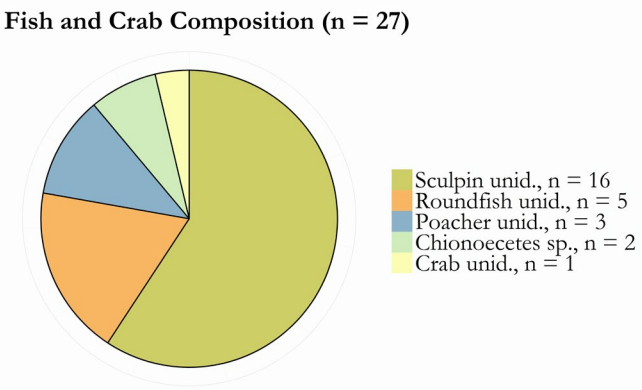
Images

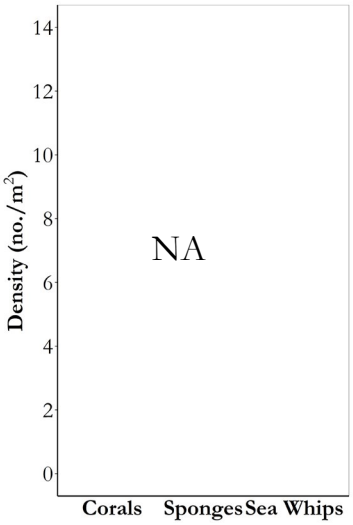


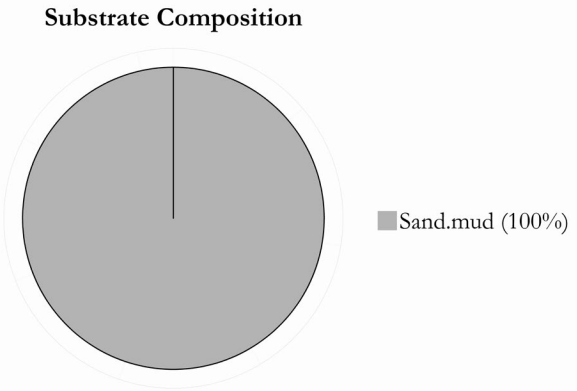
Summary - description of transect

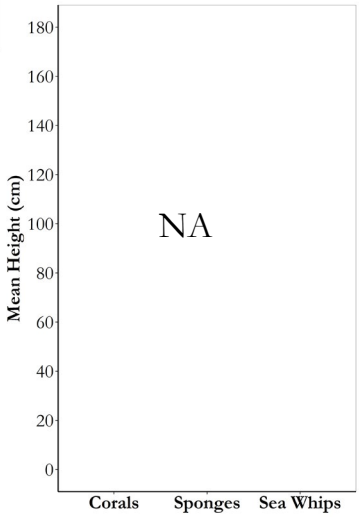
Transect 182: Primary and secondary substrates consisted entirely of sand and mud. Of the 38 individuals counted, eelpouts, poachers and grenadiers were the most abundant. One skate and 2 crabs were also identified. Species density was 0.04 individuals/m^2. No vertical habitat was identified.

Area: Zhemchug Canyon					Transect 184
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/28/14	58.45	-174.50	307	153	3.8

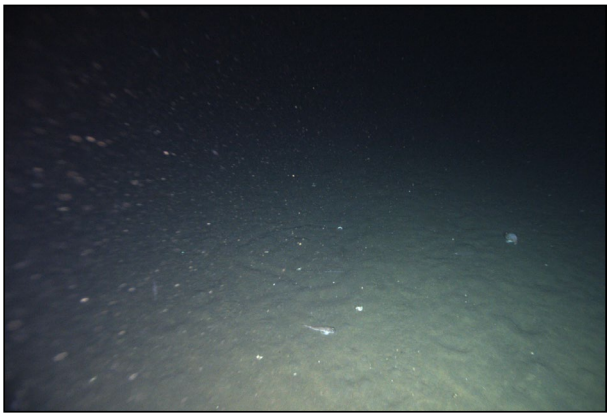


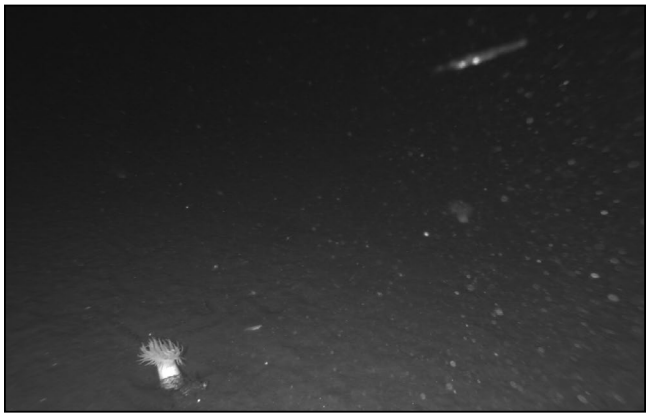






Images



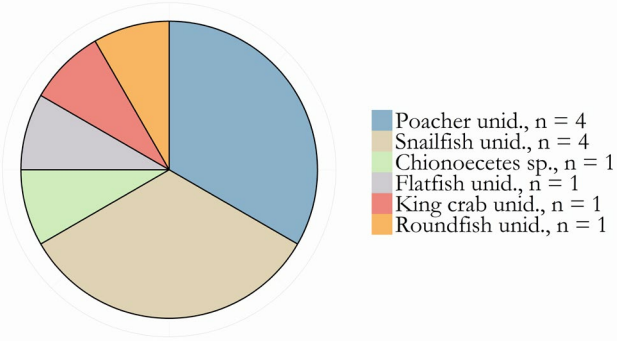


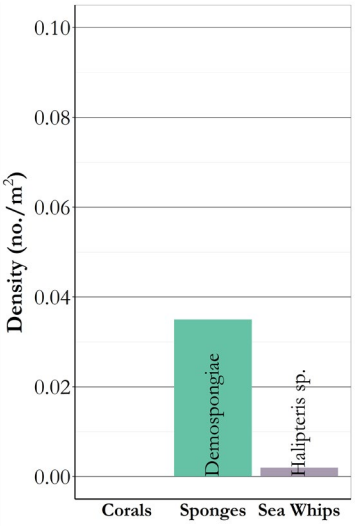
Summary - description of transect

Transect 184: Primary and secondary substrates consisted entirely of sand and mud. Of the 27 individuals counted, sculpins, unidentified roundfishes, and poachers were the most abundant. Species density was 0.09 individuals/m^2. No vertical habitat was identified.

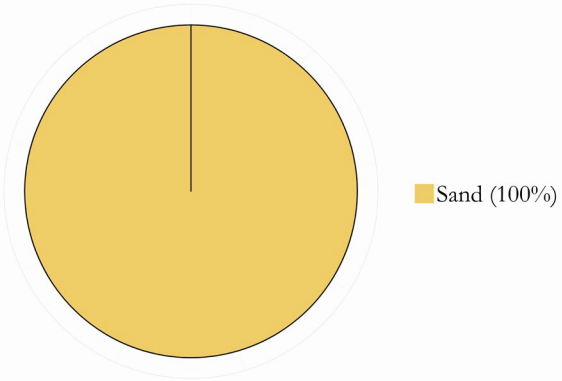
Area: Zhemchug Canyon					Transect 189
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/28/14	58.62	-174.58	596	236	3.6

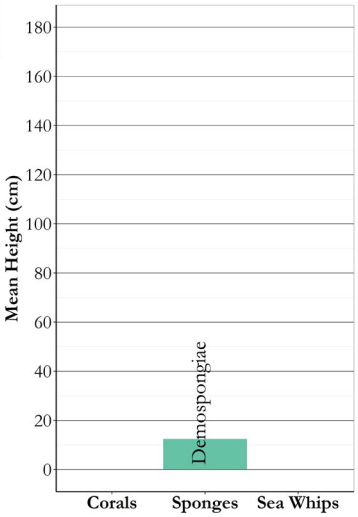
Fish and Crab Composition (n = 12)



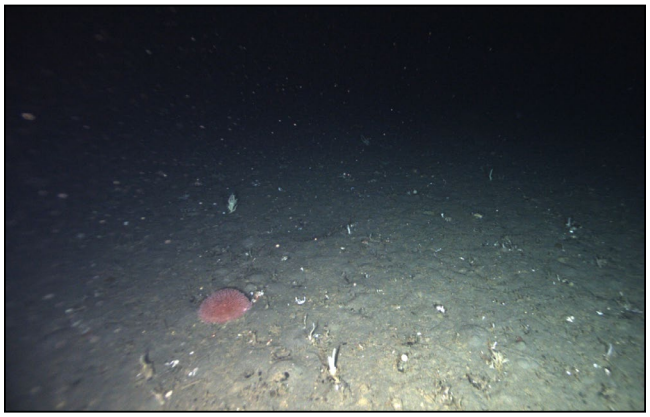


Substrate Composition





Images

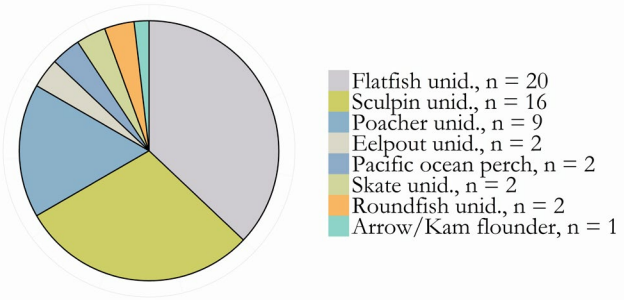


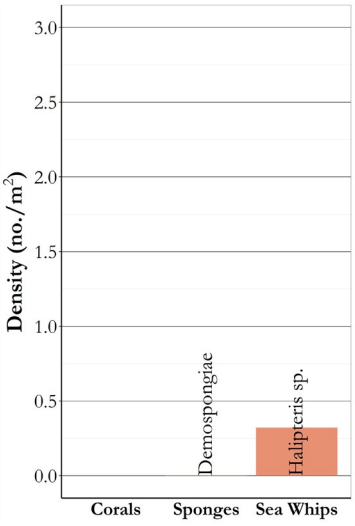
Summary - description of transect

Transect 189: Primary and secondary substrates consisted entirely of sand. Species density was 0.02 individuals/m^2, and 66% of the species identified were poachers and snailfishes. Vertical habitat consisted of 21 Demospongiae and 1 sea whip. Sponge density was 0.04 individuals/m^2, and the mean height of 3 Demospongiae was 12.4 cm. No other corals were identified.

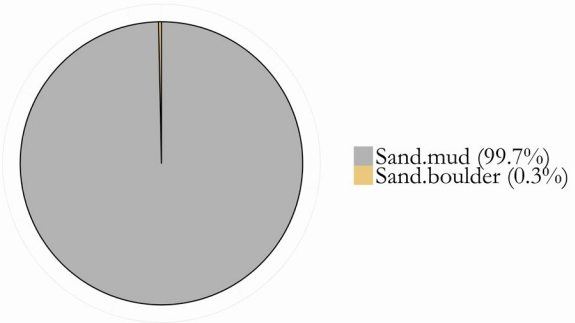
Area: Zhemchug Canyon					Transect 190
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/28/14	58.63	-174.61	1,109	251	3.7

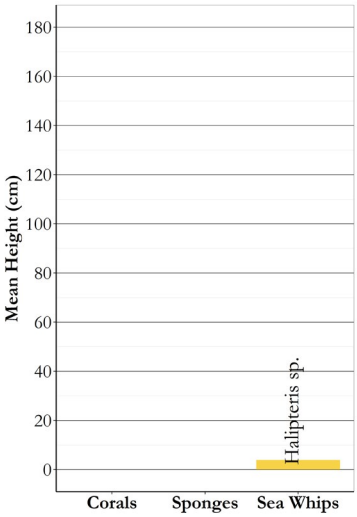
Fish and Crab Composition (n = 54)



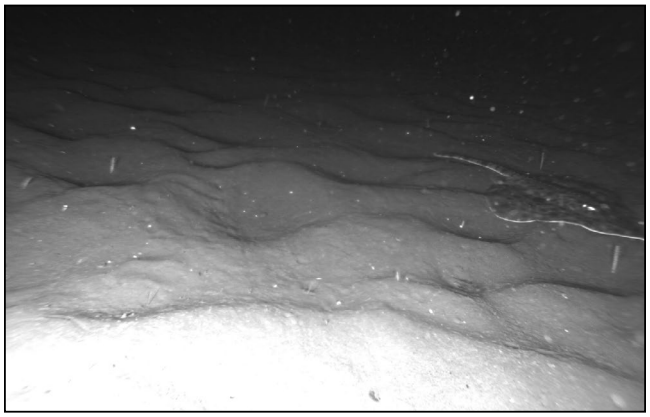


Substrate Composition





Images

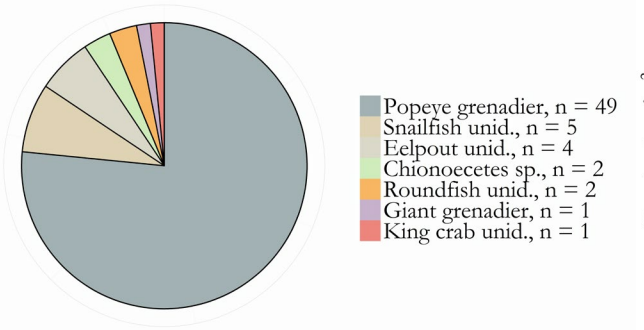


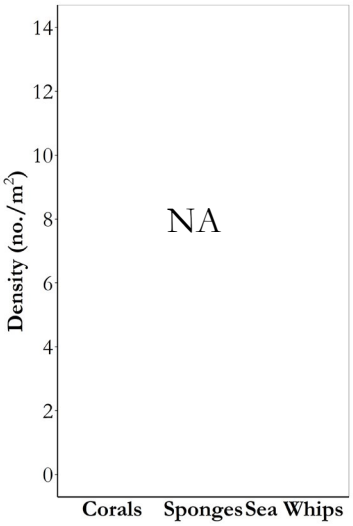
Summary - description of transect

Transect 190: Primary and secondary substrates consisted entirely of sand and mud. Of the 57 individuals counted, 39% were flatfishes, and 47% were sculpins and poachers. Species density was 0.05 individuals/m^2. Vertical habitat consisted of 3 Demospongiae and 357 sea whips. Habitat density was 0.32 individuals/m^2, and the mean height of 107 sea whips was 3.9 cm. No other corals were identified.

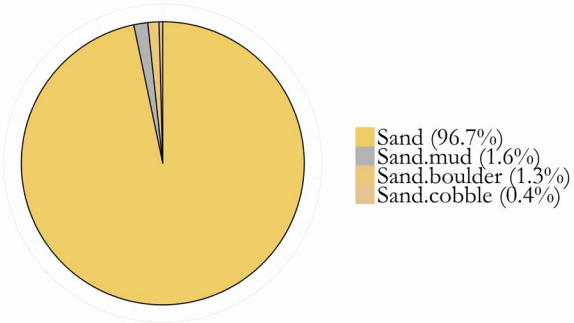
Area: Zhemchug Canyon					Transect 191
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/29/14	58.57	-174.71	1,194	701	3.2

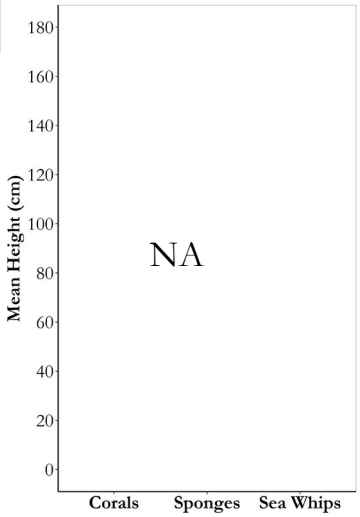
Fish and Crab Composition (n = 64)





Substrate Composition



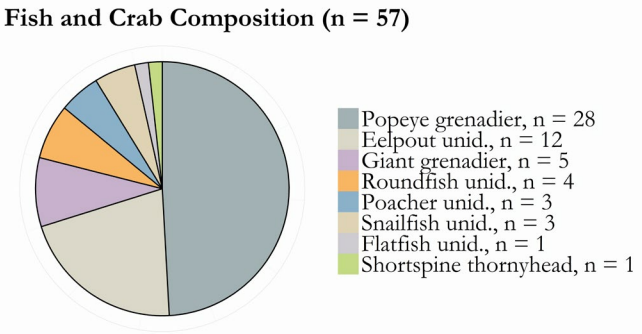


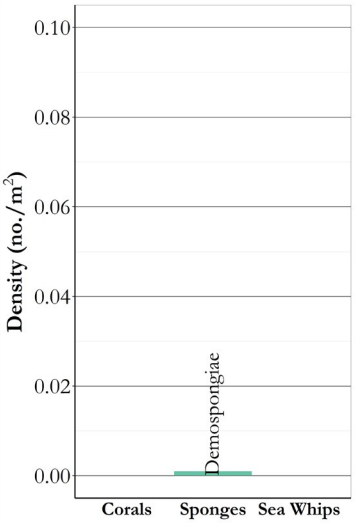
Images

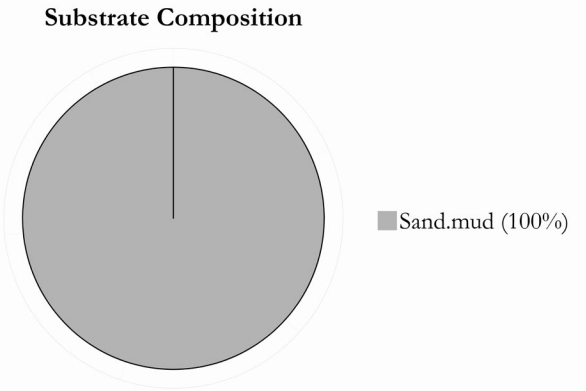
Summary - description of transect

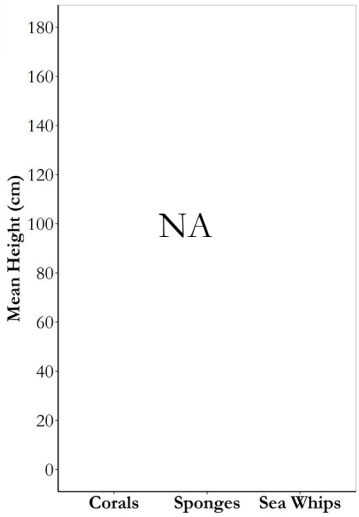
Transect 191: Primary and secondary substrates consisted largely of sand. Of the 64 individuals counted, popeye grenadier were most abundant. Species density was 0.05 individuals/m^2. No vertical habitat was identified.

Area: Zhemchug Canyon					Transect 192
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/29/14	58.56	-174.79	1,031	737	3.3









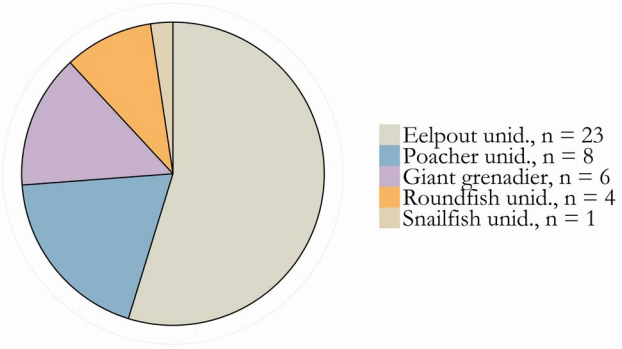
Images

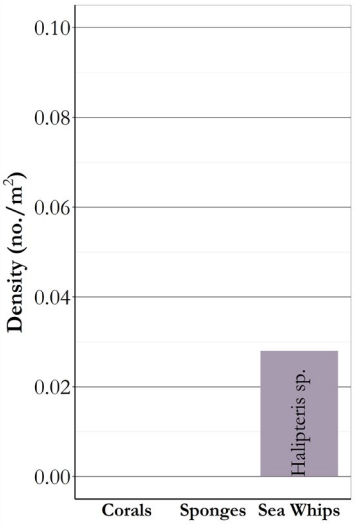
Summary - description of transect

Transect 192: Primary and secondary substrates consisted entirely of sand and mud. Of the 57 individuals counted, popeye grenadier and eelpouts ($n = 12$) were most abundant. Species density was 0.06 individuals/m^2. One Demospongiae was observed. No corals were identified.

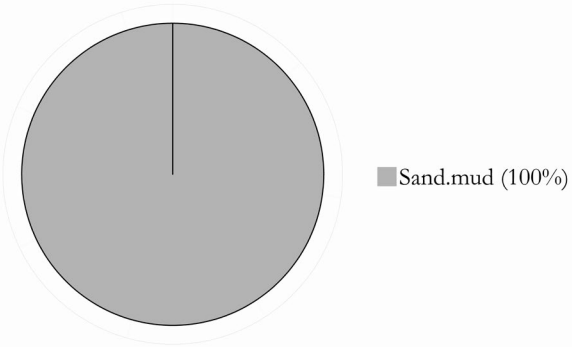
Area: Zhemchug Canyon					Transect 193
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/29/14	58.56	-174.82	679	744	3.3

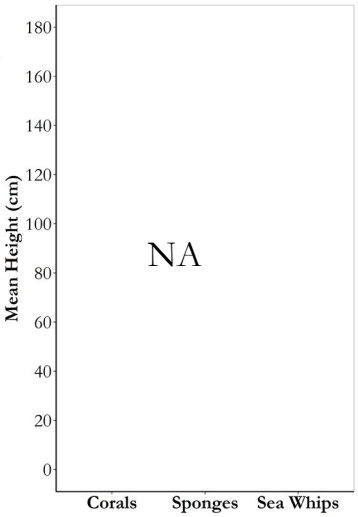
Fish and Crab Composition (n = 42)



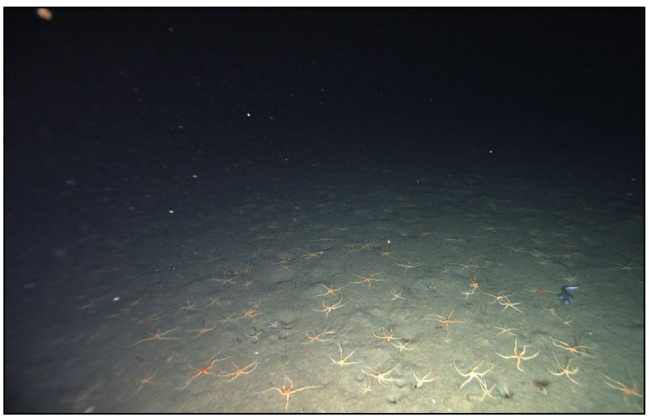


Substrate Composition





Images

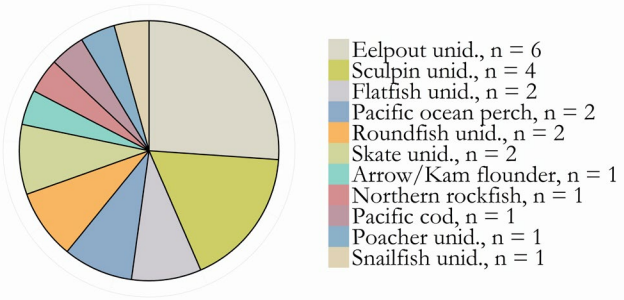


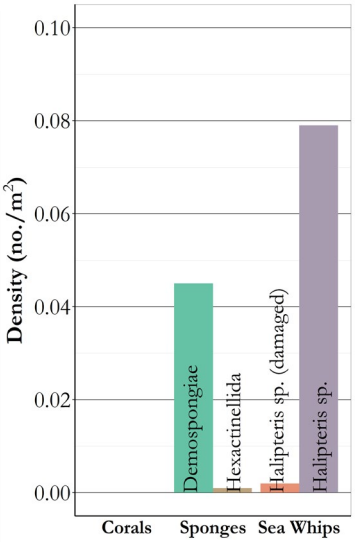
Summary - description of transect

Transect 193: Primary and secondary substrates consisted entirely of sand and mud. Of the 42 individuals counted, 55% were eelpouts. Fish density was 0.06 individuals/m^2. Vertical habitat consisted of 19 sea whips. Sea whip density was 0.03 individuals/m^2. No other corals or sponges were identified.

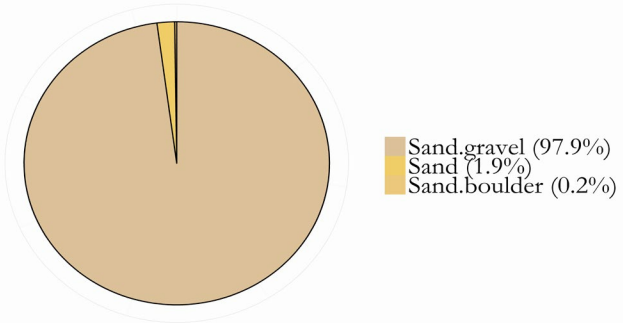
Area: Zhemchug Canyon					Transect 194
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/29/14	58.64	-175.00	970	288	3.8

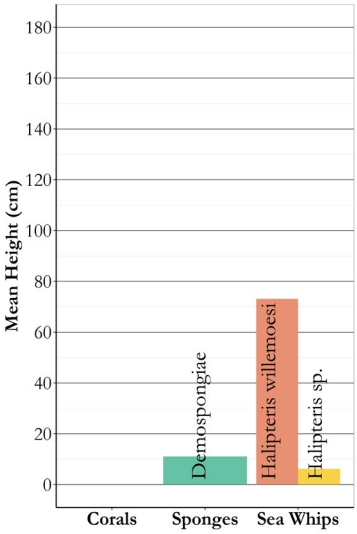
Fish and Crab Composition (n = 23)



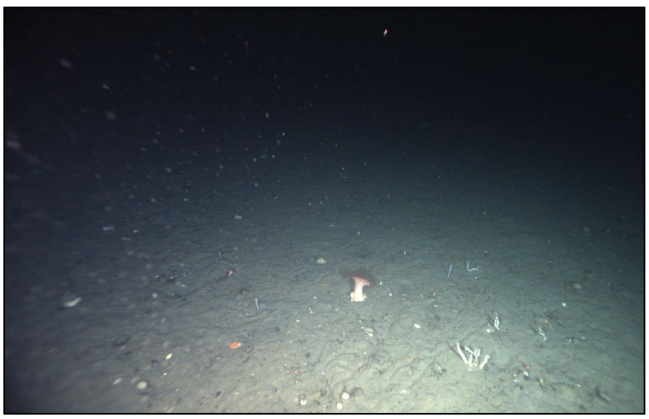


Substrate Composition





Images

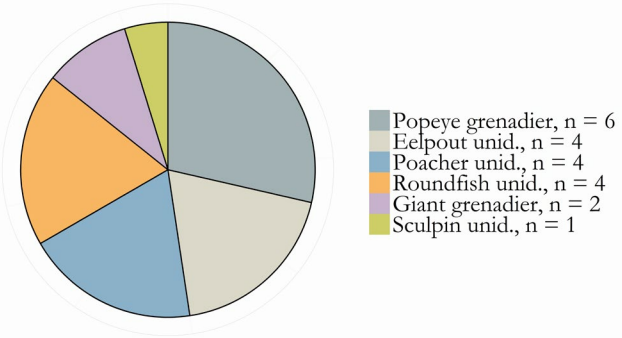


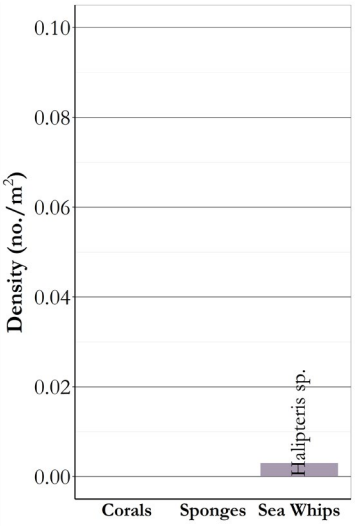
Summary - description of transect

Transect 194: Primary and secondary substrates consisted mostly of sand and gravel. Only 23 individuals were counted, and eelpouts were the most abundant. Species density was 0.02 individuals/m^2. Vertical habitat consisted of 79 sea whips (2 damaged), 44 Demospongiae, and 1 Hexactinellida. Habitat density was 0.13 individuals/m^2. Mean height of 4 measured Demospongiae was 11.1 cm. Measured sea whips were divided into *Halipteris* sp. ($n = 20$) and *Halipteris willemoesi* ($n = 2$), and their mean heights were 6.2 cm and 73.0 cm, respectively.

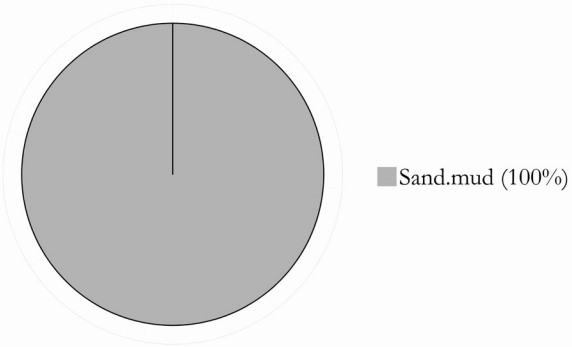
Area: Zhemchug Canyon					Transect 195
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/29/14	58.49	-175.15	785	659	3.4

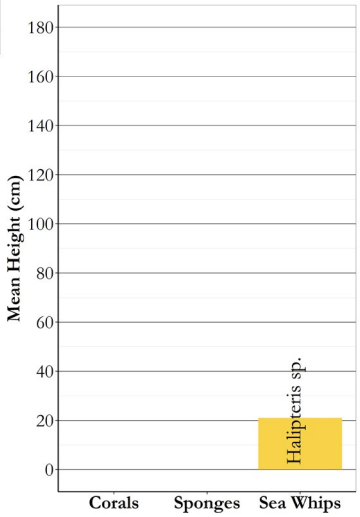
Fish and Crab Composition (n = 21)



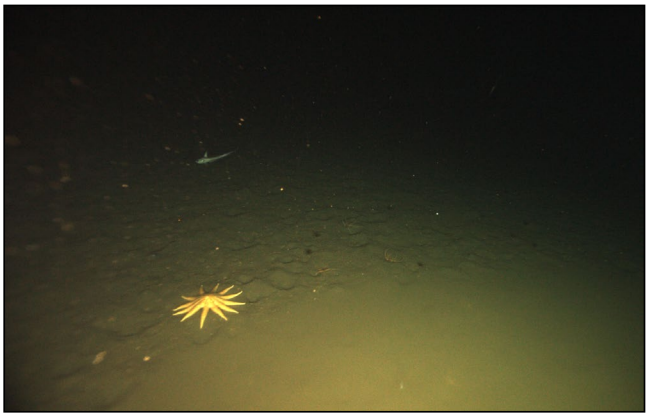


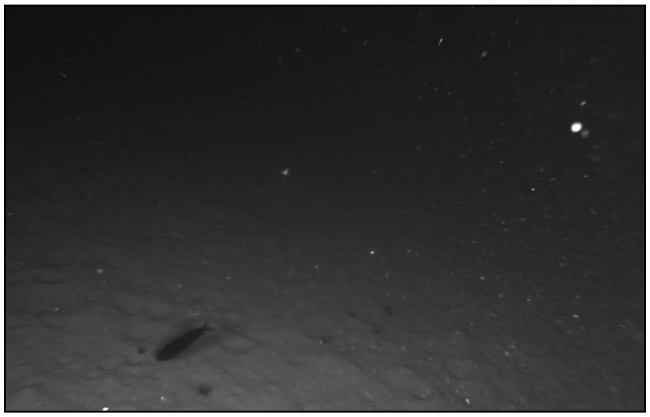
Substrate Composition





Images



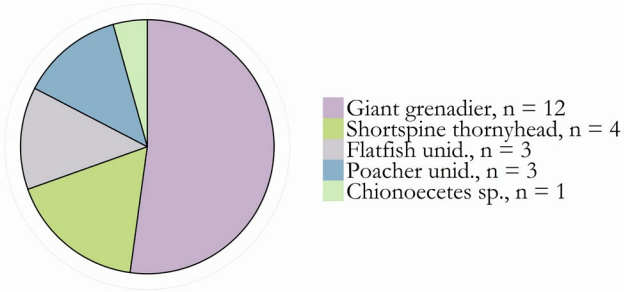


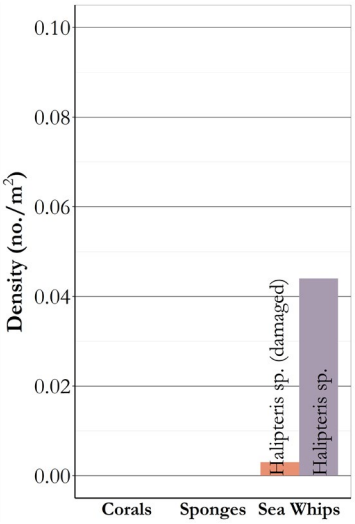
Summary - description of transect

Transect 195: Primary and secondary substrates consisted entirely of sand and mud. Only 21 individuals were identified, and the counts were evenly distributed among the groups. Species density was 0.03 individuals/m^2. Two sea whips were counted and measured (21.0 cm). No other corals or sponges were identified.

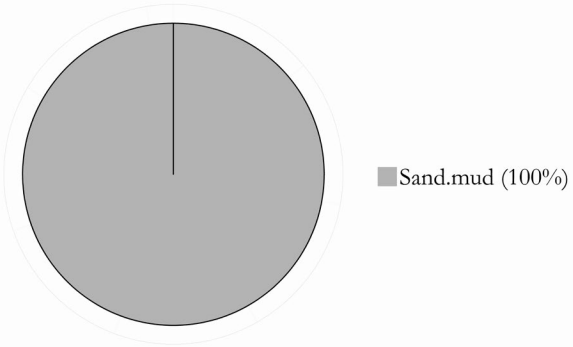
Area: Zhemchug Canyon					Transect 196
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/29/14	58.36	-175.09	1,281	479	3.7

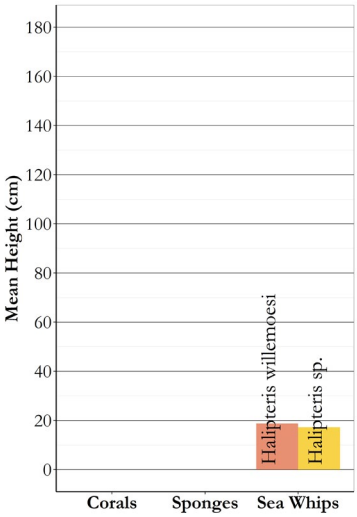
Fish and Crab Composition (n = 23)





Substrate Composition





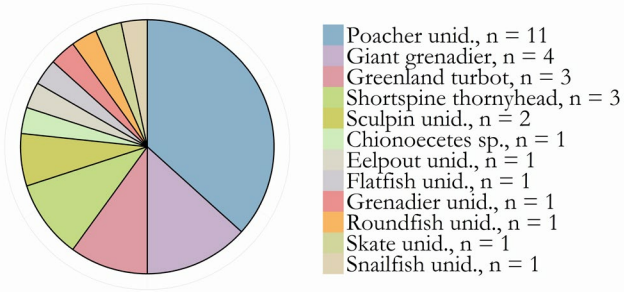
Images

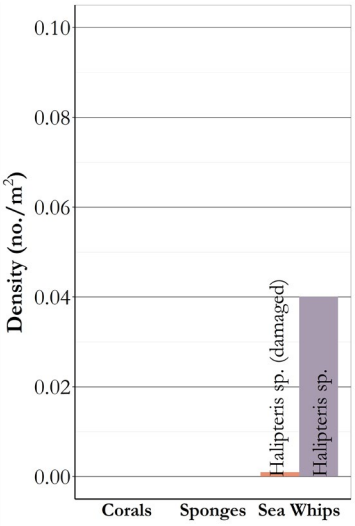
Summary - description of transect

Transect 196: Primary and secondary substrates consisted entirely of sand and mud. Only 23 individuals were identified, and giant grenadiers were the most abundant. Species density was 0.02 individuals/m^2. Vertical habitat consisted of 60 sea whips (4 damaged). Mean height for 10 measured sea whips was 17.3 cm. No other corals or sponges were identified.

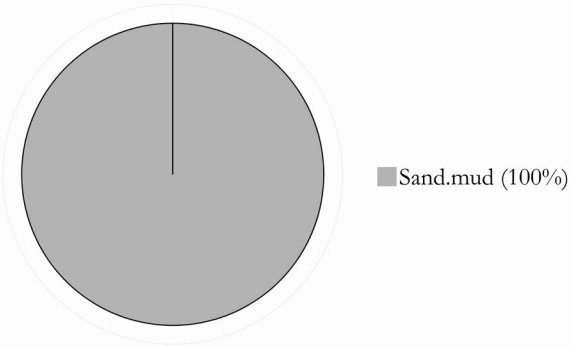
Area: Zhemchug Canyon					Transect 197
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/29/14	58.32	-175.15	1,645	468	3.7

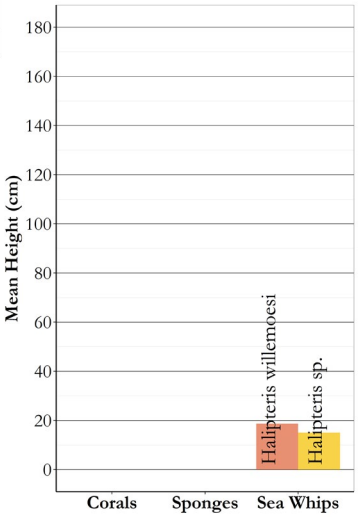
Fish and Crab Composition (n = 30)





Substrate Composition





Images

Summary - description of transect

Transect 197: Primary and secondary substrates consisted entirely of sand and mud. Of the 30 individuals counted, poachers were the most abundant. One skate, 1 crab, and 3 Greenland turbot were also identified in this transect. Species density was 0.02 individuals/m^2. Vertical habitat consisted of 67 sea whips (2 damaged). Mean height for 21 measured sea whips was 16.2 cm. No other corals or sponges were identified.

Zhemchug to Pervenets Canyon

Fifteen transects were completed between Zhemchug Canyon and Pervenets Canyon. Depths ranged from 215 m to 770 m. Twenty-three taxa of fishes and crabs were identified (Table 26). Very little vertical habitat was observed (Table 27). Heights ranged from 3.8 cm to 46.8 cm (Table 28).

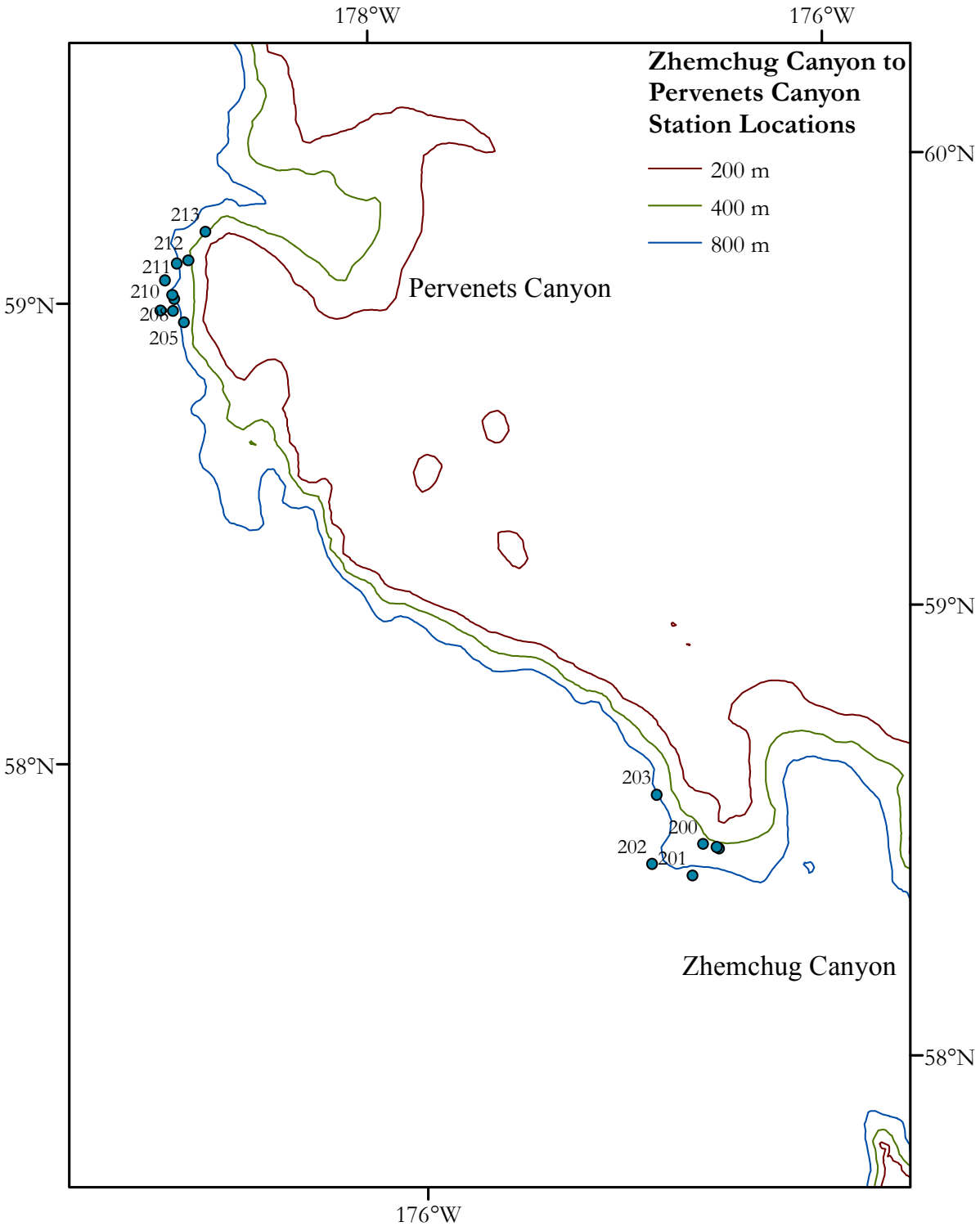


Figure 22. -- Survey transect locations, Zhemchug to Pervenets Canyon.

SITE SUMMARY: Zhemchug Canyon to Pervenets Canyon

Transects between Zhemchug Canyon to Pervenets Canyon were concentrated around the northern and southern ends of the region due to time constraints (Fig. 22). All substrates observed contained sand as the primary substrate. Boulders were identified in two transects (Table 25).

Popeye grenadiers was the most abundant species of crabs or fishes observed, occurring at a mean depth of greater than 571 m (Table 26). Eelpouts and sculpins were the next most frequently identified. Overall, twenty-three taxa of fish and crabs were identified.

Demospongiae and *Halipteris* provided the only vertical habitat (Table 27, Figures 23 and 24). Heights ranged from 3.8 cm to 46.8 cm with *Halipteris willemoesi* being the tallest (Table 28).

Table 25. -- Summary of substrates observed at transects ($n = 15$) between Zhemchug Canyon and Pervenets Canyon.

Substrate	Depth range (m)	Number of transects with observed substrate	Percent of observed substrate
Sand.mud	215 - 770	15	97%
Sand*	571 - 571	1	2%
Sand.gravel	571 - 571	1	1%
Sand.mixed coarse	571 - 571	1	<1%
Sand.boulder	571 - 723	2	<1%

*Primary and secondary substrates were the same.

Table 26. -- Summary of fishes and crabs identified at transects ($n = 15$) between Zhemchug Canyon and Pervenets Canyon.

Species/Grouping	Number of occurrences	Number of transects with occurrences	Mean transect depth range (m)	Mean density (individuals/m^2)
Popeye grenadier	408	5	571 - 770	0.05
Eelpout unid.	93	12	328 - 770	0.01
Sculpin unid.	76	13	215 - 761	<0.01
Flatfish unid.	47	13	215 - 571	<0.01
Roundfish unid.	37	15	215 - 770	<0.01
Poacher unid.	36	11	215 - 770	<0.01
Giant grenadier	27	8	371 - 770	<0.01
Snailfish unid.	25	10	305 - 770	<0.01
Chionoecetes sp.	22	9	328 - 770	<0.01
Skate unid.	14	6	215 - 710	<0.01
Shortspine thornyhead	13	6	359 - 571	<0.01
Grenadier unid.	12	3	571 - 761	<0.01
Walleye pollock	9	5	247 - 372	<0.01
Rex sole	7	4	359 - 412	<0.01
Arrowtooth/Kamchatka flounder	5	2	247 - 305	<0.01
Rockfish unid.	5	3	371 - 412	<0.01
Shortraker rockfish	3	1	371 - 371	<0.01
Sablefish	2	2	305 - 571	<0.01
Flathead sole	2	1	412 - 412	<0.01
Deepsea sole	2	2	723 - 761	<0.01
Pacific ocean perch	1	1	305 - 305	<0.01
Greenland turbot	1	1	412 - 412	<0.01
Cod/pollock unid.	1	1	247 - 247	<0.01

Table 27. -- Summary of coral, sponge, and sea whip taxa identified at transects ($n = 15$)between Zhemchug Canyon and Pervenets Canyon.

Species/Grouping	Number of occurrences	Number of transects with occurrences	Mean transect depth range (m)	Mean density (individuals/m^2)
Demospongiae	239	10	215 761	0 02
Halipteris sp	192	7	305 571	0 02
Demospongiae (damaged)	12	3	305 412	<0.01
Halipteris sp. (damaged)	3	2	328 372	<0.01

**Halipteris* sp. (damaged) is not accounted for in the *Halipteris* sp grouping

Table 28. -- Summary of coral, sponge, and sea whip mean height from transects completed between Zhemchug Canyon and Pervenets Canyon.

Species/Grouping	Number measured	Mean height (cm)	Minimum height (cm)	Maximum height (cm)
Halipteris sp	61	9 2	3 8	30 7
Demospongiae	41	15.5	10.6	26.6
Halipteris willemoesi	15	19 9	12 2	46.8

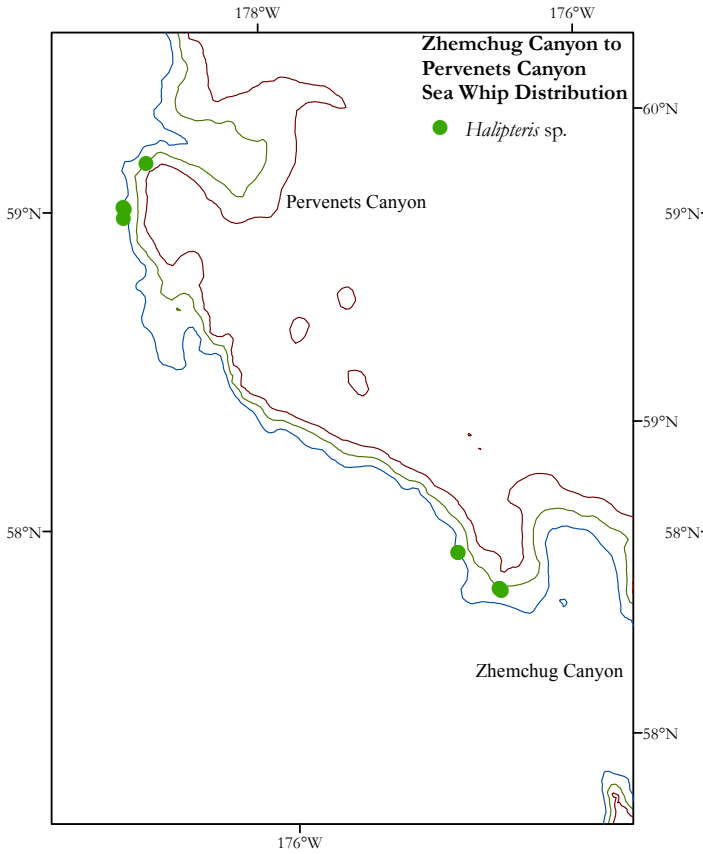


Figure 23. -- Sea whip distribution, Zhemchug Canyon to Pervenets Canyon.

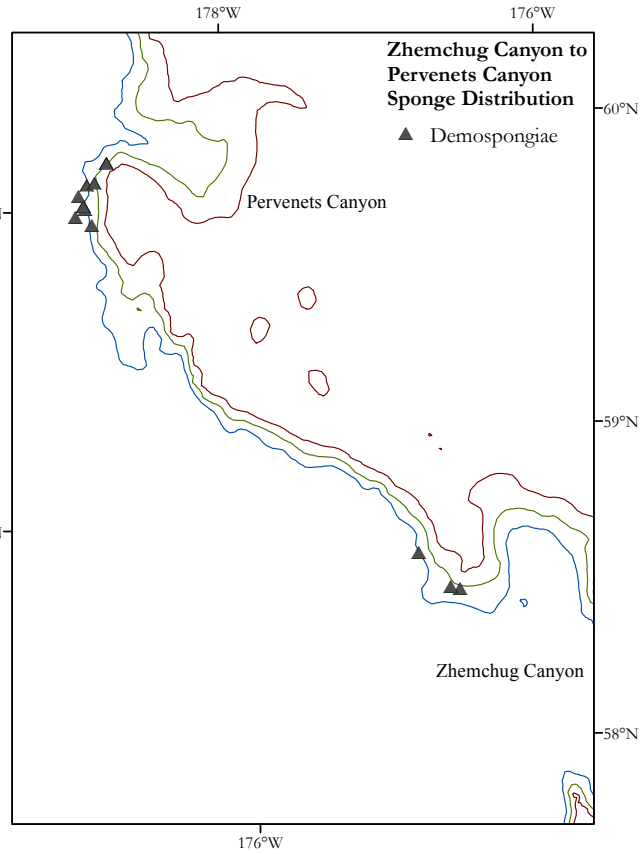
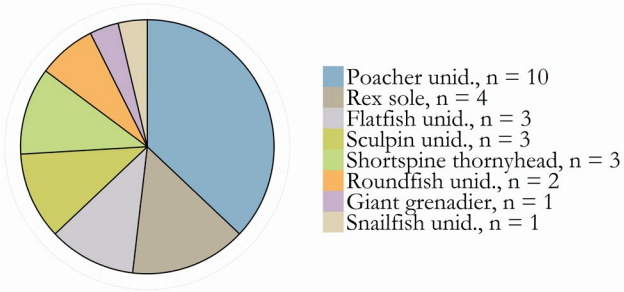
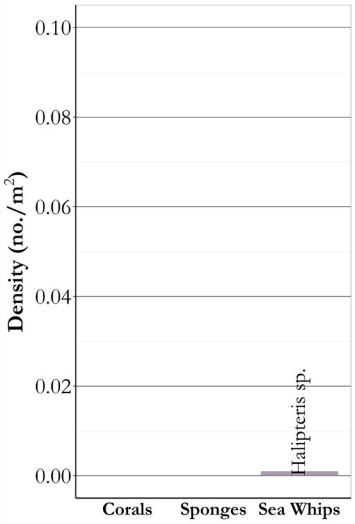


Figure 24. -- Sponge distribution, Zhemchug Canyon to Pervenets Canyon.

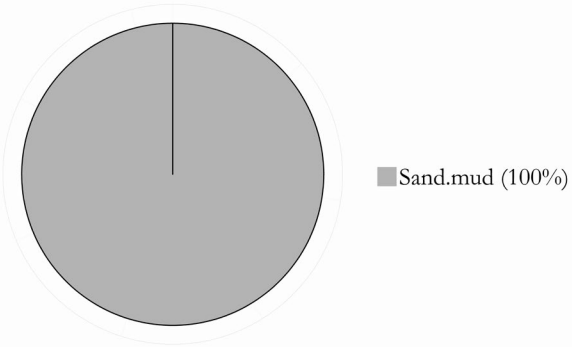
Area: Zhemchug Canyon to Pervenets Canyon					Transect 198
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/29/14	58.32	-175.26	1,390	385	3.9

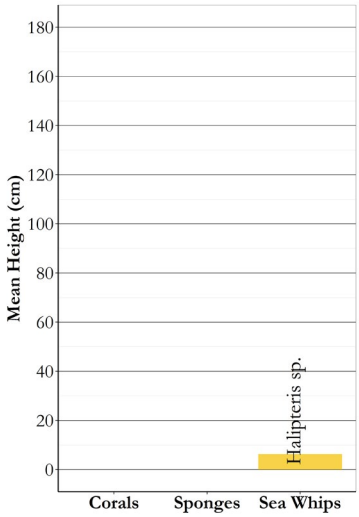
Fish and Crab Composition (n = 27)



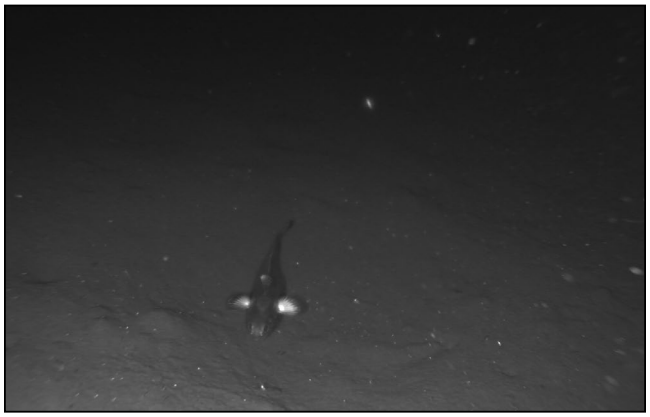


Substrate Composition





Images

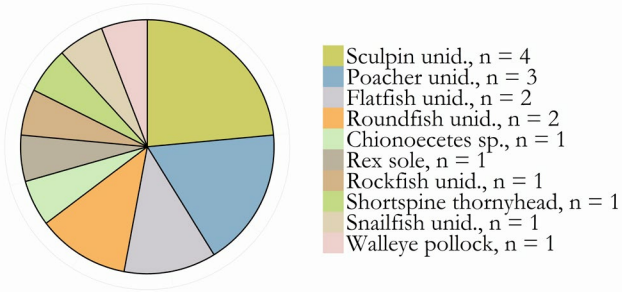


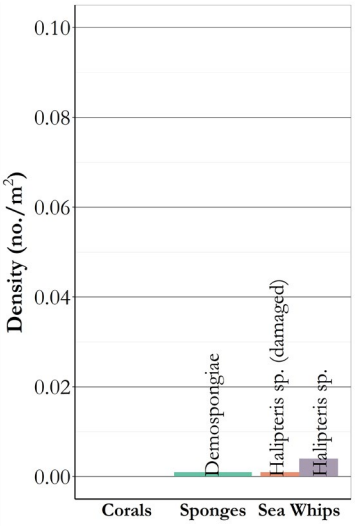
Summary - description of transect

Transect 198: Primary and secondary substrates consisted entirely of sand and mud. Of the 27 individuals counted, poachers were the most abundant. Fish density was 0.02 individuals/m^2. Vertical habitat consisted of 2 sea whips. One sea whip was measured (6.3 cm). No other corals or sponges were identified.

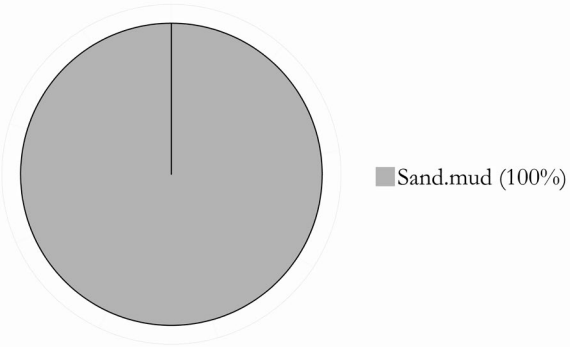
Area: Zhemchug Canyon to Pervenets Canyon					Transect 199
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/29/14	58.32	-175.28	1,047	372	3.9

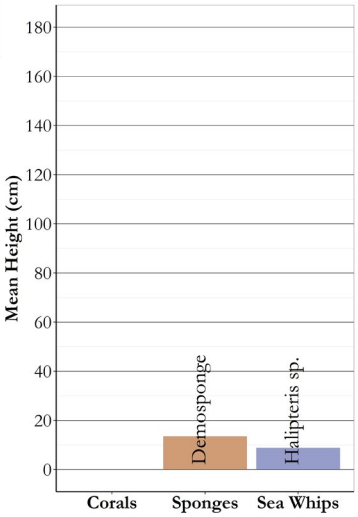
Fish and Crab Composition (n = 17)



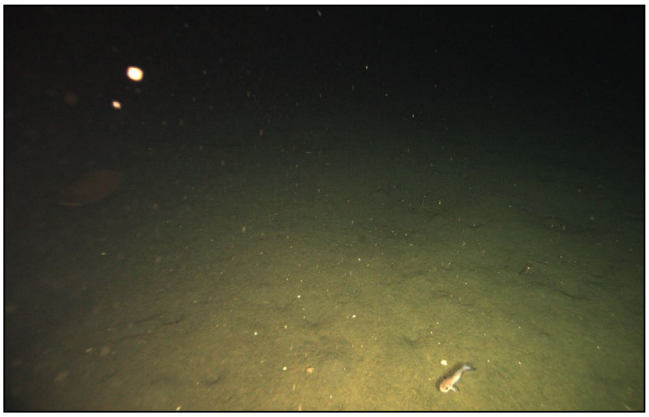


Substrate Composition





Images

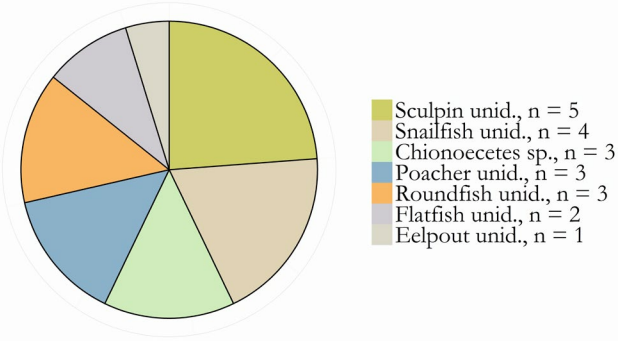


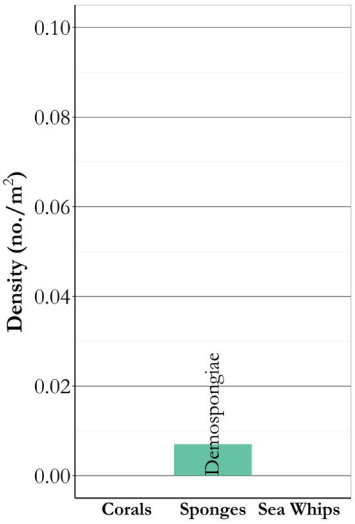
Summary - description of transect

Transect 199: Primary and secondary substrates consisted entirely of sand and mud. Only 17 individuals were identified, and sculpins, poachers, unidentified roundfishes and flatfishes accounted for 72% of the observations. Species density was 0.02 individuals/m^2. Vertical habitat consisted of 5 sea whips (1 damaged), and 1 Demospongiae. One sea whip was measured (8.8 cm) as well as 1 Demospongiae (13.6 cm). No other corals were identified.

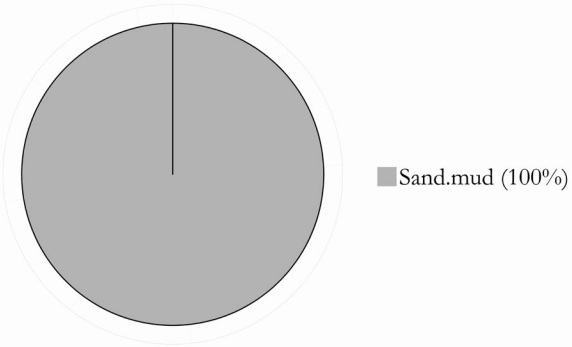
Area: Zhemchug Canyon to Pervenets Canyon					Transect 200
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/29/14	58.32	-175.34	849	375	3.8

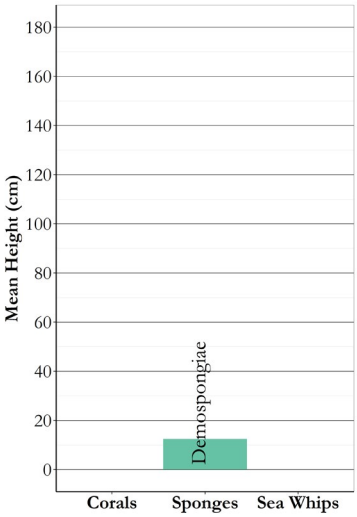
Fish and Crab Composition (n = 21)





Substrate Composition





Images

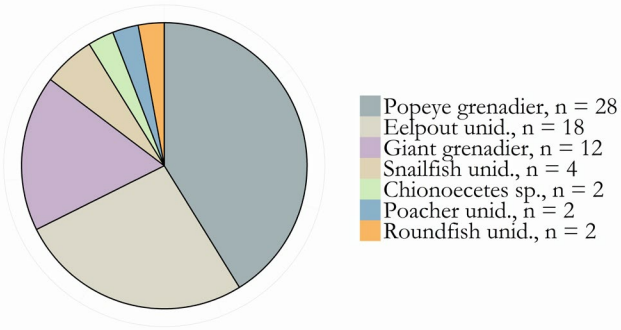
Summary - description of transect

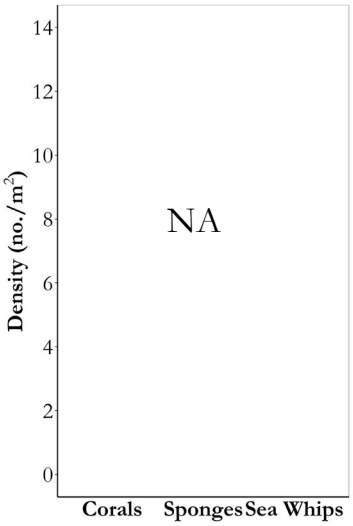
Transect 200: Primary and secondary substrates consisted entirely of sand and mud. Only 21 individuals were identified, and species density was 0.02 individuals/m^2. Vertical habitat consisted of 6 Demospongiae. Sponge density was 0.01 individuals/m^2. One Demospongiae was measured (12.4 cm). No corals were identified.

Area: Zhemchug Canyon to Pervenets Canyon — Transect 201

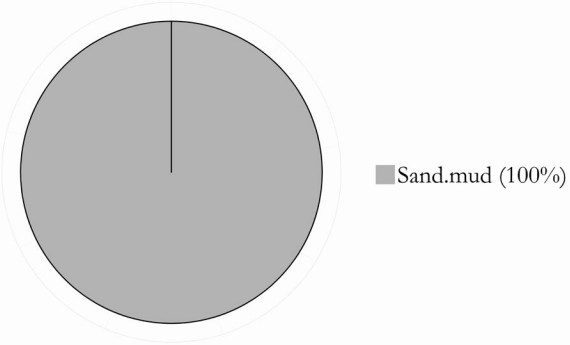
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/29/14	58.24	-175.34	1,311	770	3.2

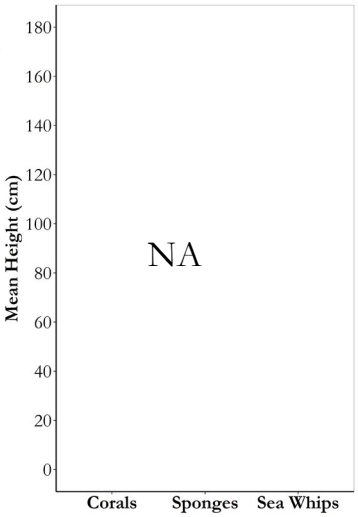
Fish and Crab Composition (n = 68)





Substrate Composition





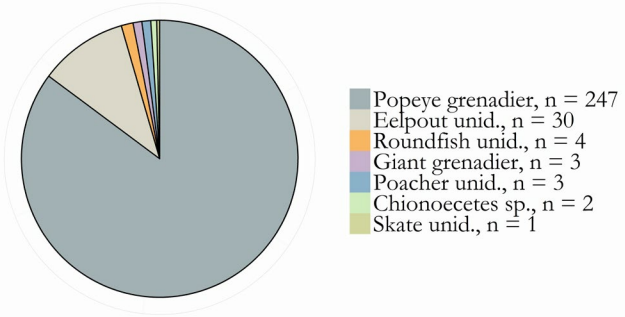
Images

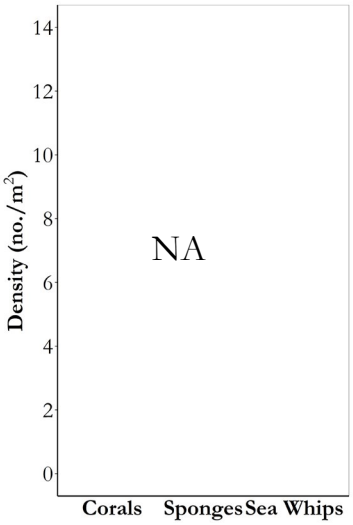
Summary - description of transect

Transect 201: Primary and secondary substrates consisted entirely of sand and mud. Of the 68 individuals identified, 41% of them were popeye grenadiers. Eelpouts and giant grenadiers comprised another 44% of the total observations. Fish and crab density was 0.05 individuals/m^2. No vertical habitat was identified.

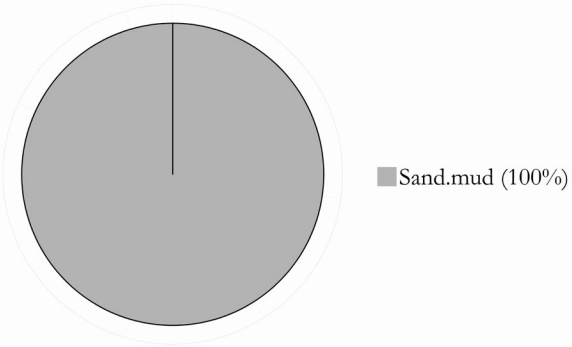
Area: Zhemchug Canyon to Pervenets Canyon					Transect 202
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/30/14	58.24	-175.53	2,141	710	3 3

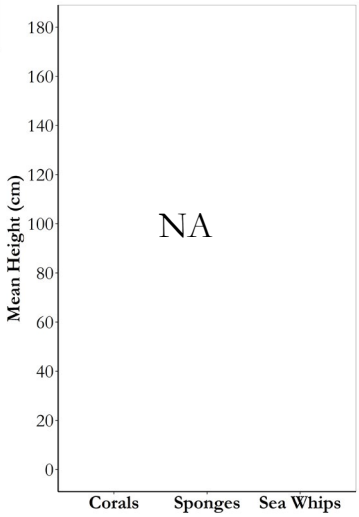
Fish and Crab Composition (n = 290)



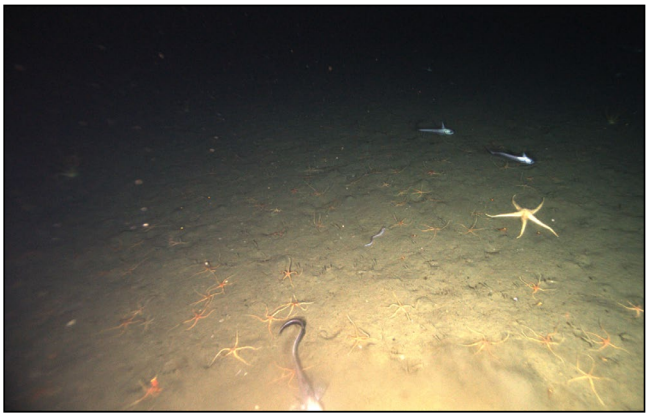


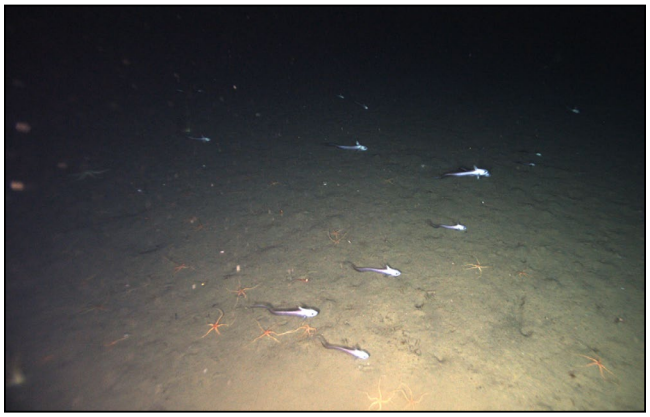
Substrate Composition





Images



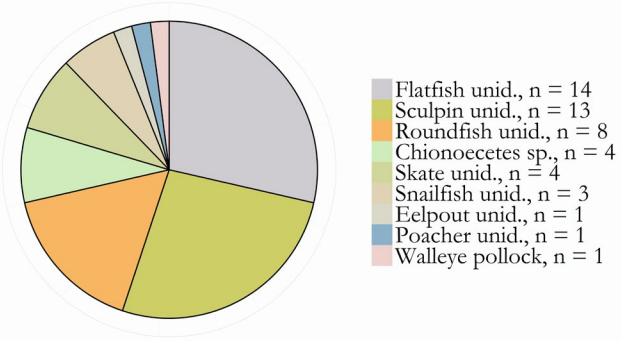


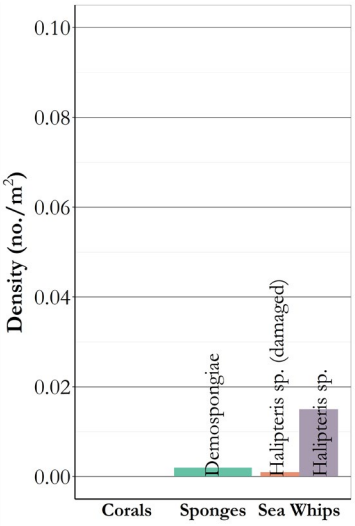
Summary - description of transect

Transect 202: Primary and secondary substrates consisted entirely of sand and mud. Of the 290 individuals identified, 85% were popeye grenadiers. Another 10% of the observations were eelpouts. Species density was 0.14 individuals/m^2. No vertical habitat was identified.

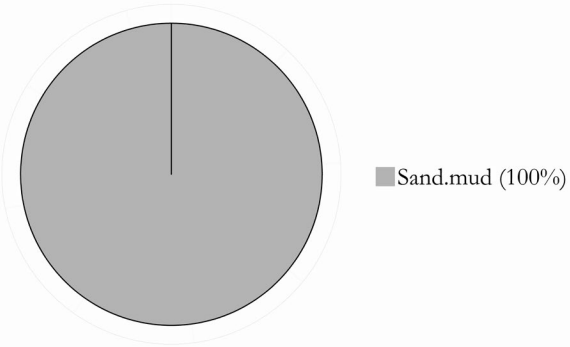
Area: Zhemchug Canyon to Pervenets Canyon					Transect 203
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/30/14	58.40	-175.60	2,220	328	3 9

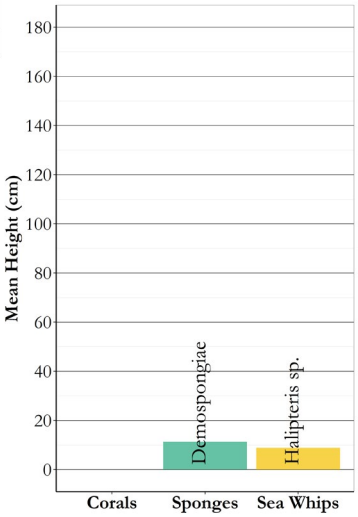
Fish and Crab Composition (n = 49)





Substrate Composition





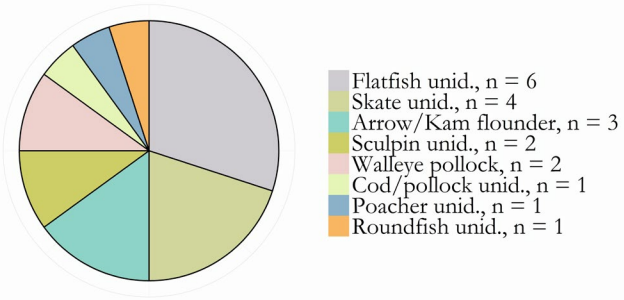
Images

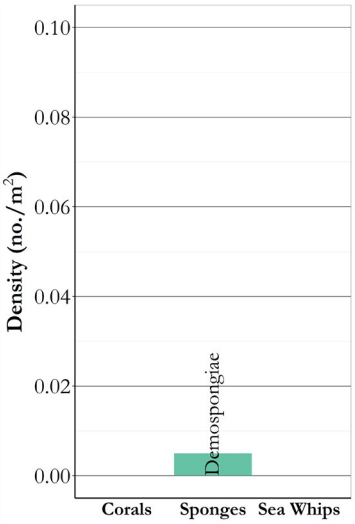
Summary - description of transect

Transect 203: Primary and secondary substrates consisted entirely of sand and mud. Of the 49 individuals counted, 29% were flatfishes and 27% were sculpins. Species density was 0.02 individuals/m^2. Vertical habitat consisted of 35 sea whips (2 damaged) and 4 Demospongiae. Sponge and sea whip density was 0.02 individuals/m^2. One Demospongiae was measured (11.3 cm) and the mean height of 8 sea whips was 8.9 cm. No other corals were identified.

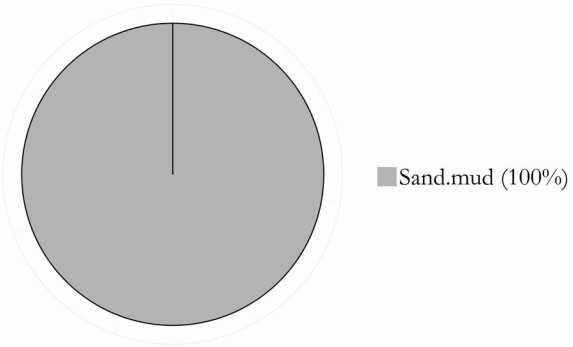
Area: Zhemchug Canyon to Pervenets Canyon					Transect 205
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/30/14	59.06	-178.33	1,565	247	3.8

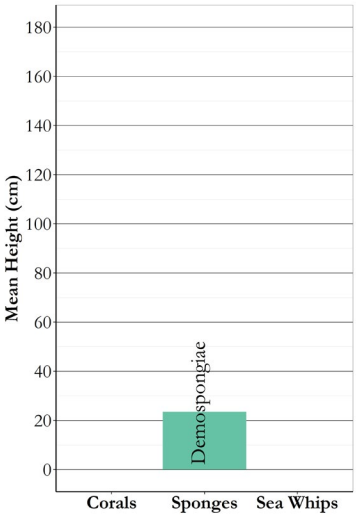
Fish and Crab Composition (n = 20)



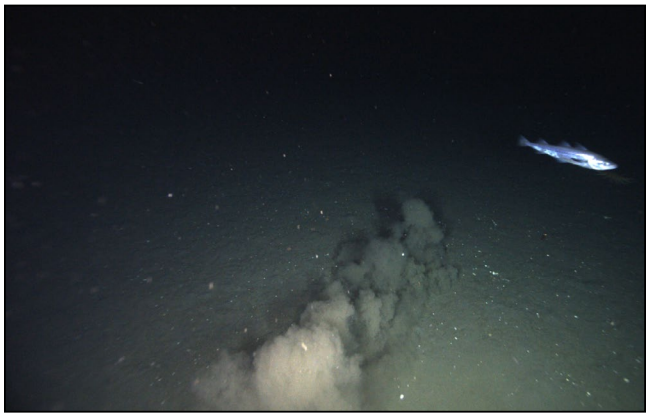


Substrate Composition





Images

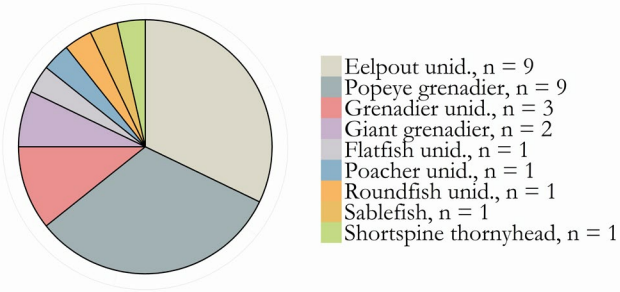


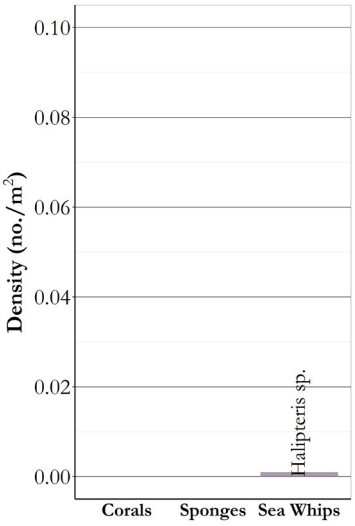
Summary - description of transect

Transect 205: Primary and secondary substrates consisted entirely of sand and mud. Only 20 individuals were identified, and 45% were flatfishes. Skates comprised another 20% of the observations. Species density was 0.01 individuals/m^2. Vertical habitat consisted of 8 Demospongiae. Sponge density was 0.01 individuals/m^2. One Demospongiae was measured (23.5 cm). No corals were identified.

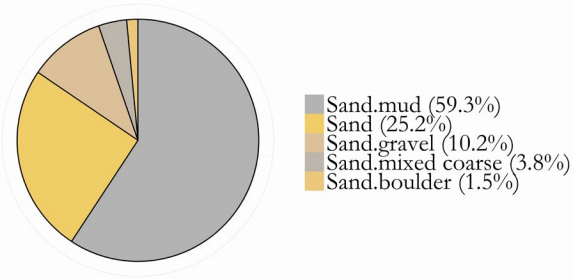
Area: Zhemchug Canyon to Pervenets Canyon					Transect 206
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/30/14	59.07	-178.39	1,288	571	3.7

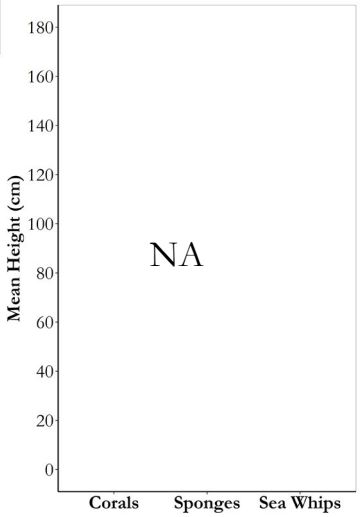
Fish and Crab Composition (n = 28)





Substrate Composition





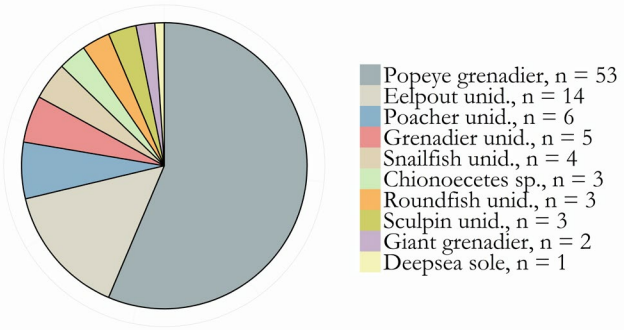
Images

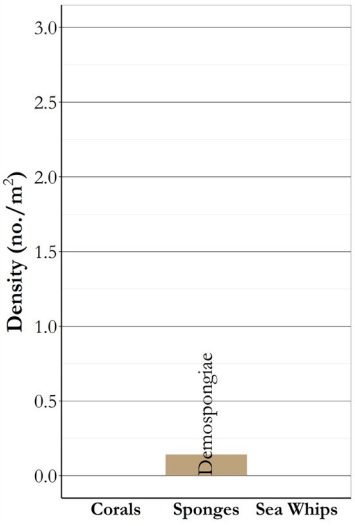
Summary - description of transect

Transect 206: Primary and secondary substrates of over half the transect were sand and mud. Sand was the second most common substrate identified. Of the 28 individuals identified, 82% were eelpouts and grenadiers. Species density was 0.02 individuals/m^2. Vertical habitat consisted of 1 sea whip. No other corals or sponges were identified.

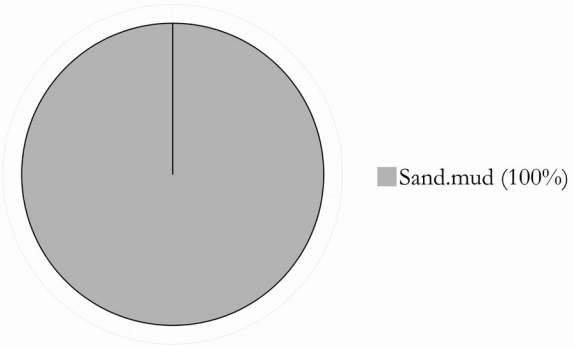
Area: Zhemchug Canyon to Pervenets Canyon					Transect 207
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/30/14	59.06	-178.45	1,395	761	3.3

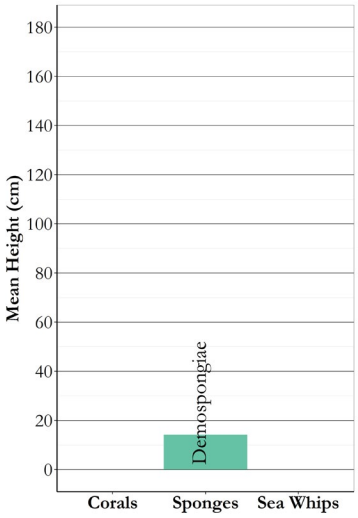
Fish and Crab Composition (n = 94)



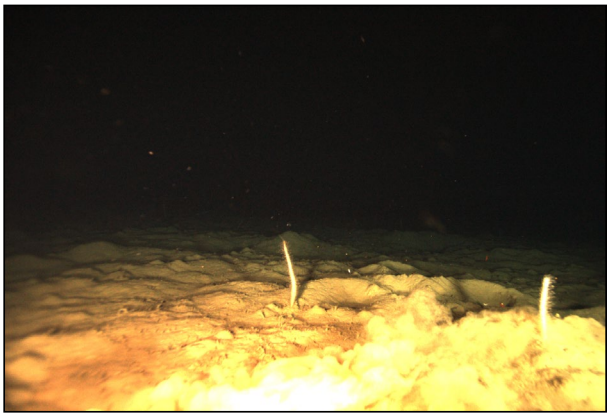


Substrate Composition





Images

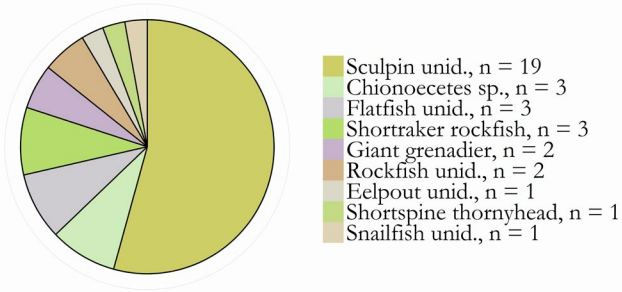


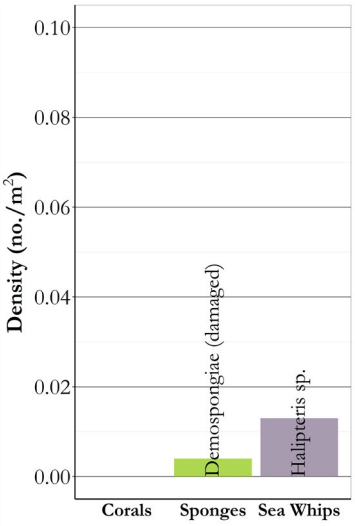
Summary - description of transect

Transect 207: Primary and secondary substrates consisted entirely of sand and mud. Of the 94 individuals identified, 78% were eelpouts and grenadiers. Species density was 0.07 individuals/m^2. Vertical habitat consisted of 198 Demospongiae. Sponge density was 0.14 individuals/m^2. Mean height of 28 measured Demospongiae was 14.2 cm. No corals were identified.

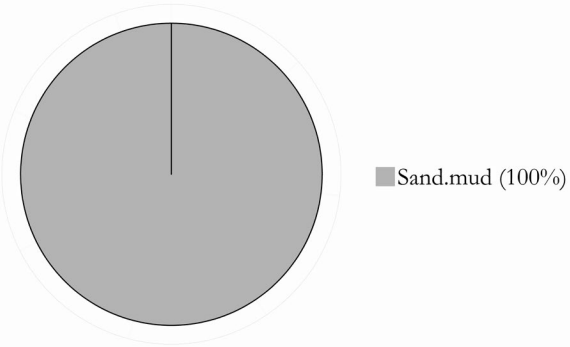
Area: Zhemchug Canyon to Pervenets Canyon					Transect 208
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/30/14	59.10	-178.41	1,242	371	3.9

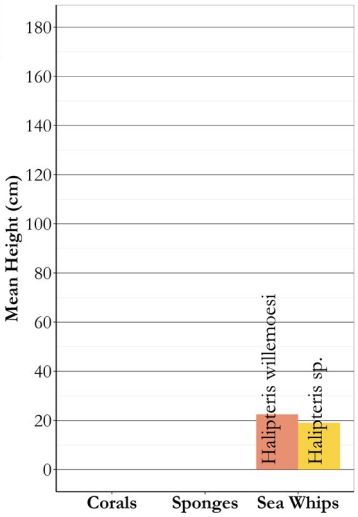
Fish and Crab Composition (n = 35)



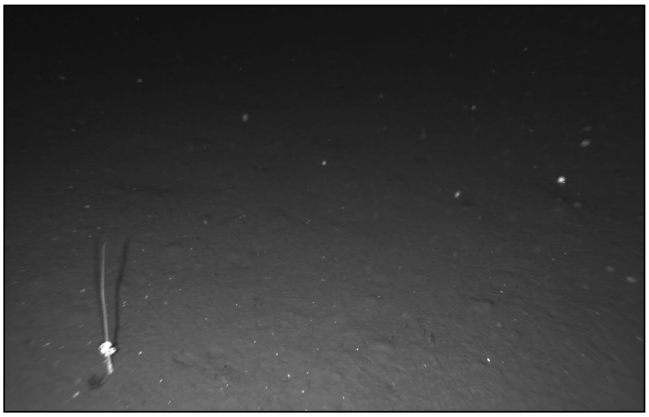


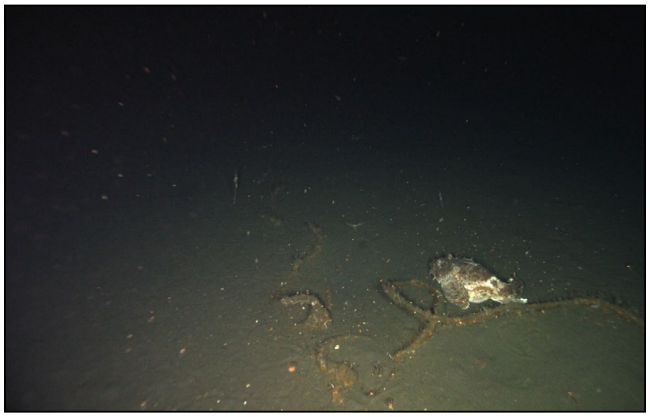
Substrate Composition





Images



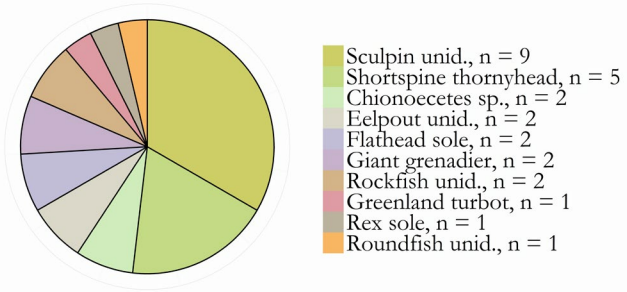


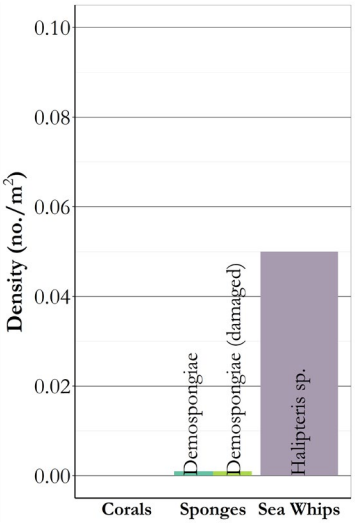
Summary - description of transect

Transect 208: Primary and secondary substrates consisted entirely of sand and mud. Of the 35 individuals identified, 54% were sculpins. Species density was 0.03 individuals/m^2. Vertical habitat consisted of 5 damaged Demospongiae and 16 sea whips. Sponge and sea whip density was 0.02 individuals/m^2. Mean height of 8 measured sea whips was 21.2 cm.

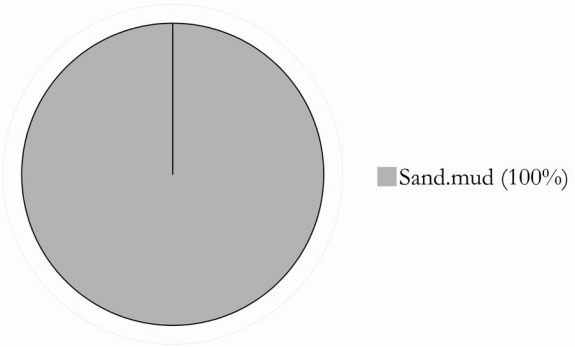
Area: Zhemchug Canyon to Pervenets Canyon					Transect 209
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/30/14	59.11	-178.42	983	412	3.8

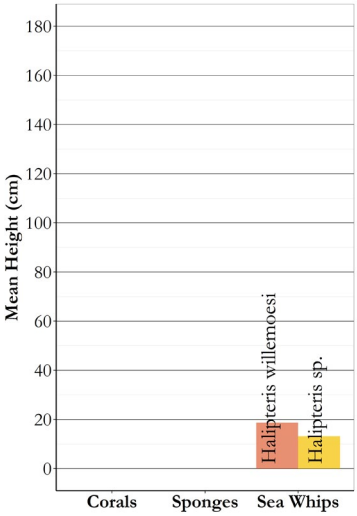
Fish and Crab Composition (n = 27)





Substrate Composition





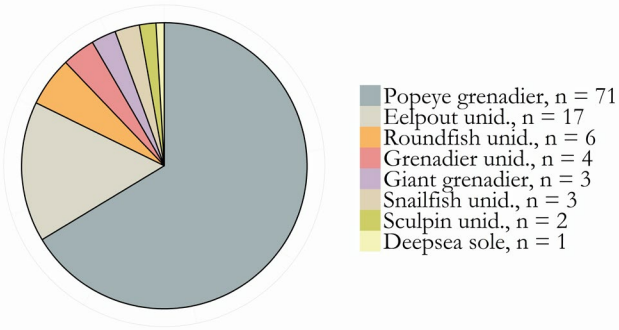
Images

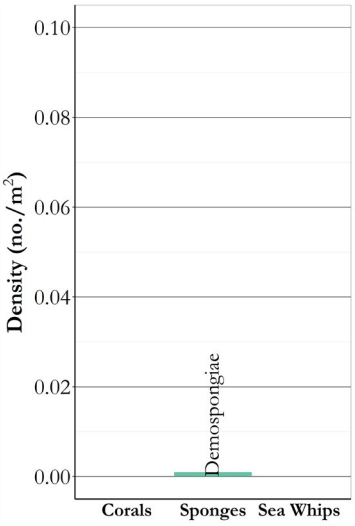
Summary - description of transect

Transect 209: Primary and secondary substrates consisted entirely of sand and mud. Of the 27 individuals identified, 52% were sculpins and shortspine thornyheads. Species density was 0.03 individuals/m^2. Vertical habitat consisted of 2 Demospongiae (1 damaged) and 49 sea whips. Sponge and sea whip density was 0.05 individuals/m^2. Mean height of 17 measured sea whips was 16.4 cm

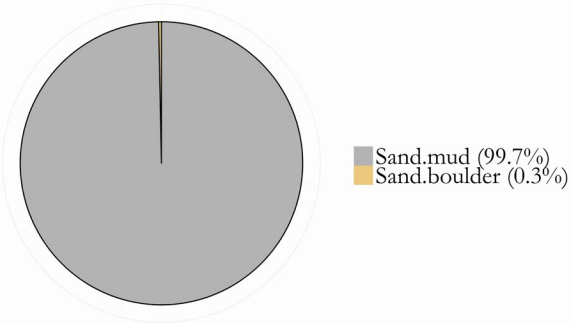
Area: Zhemchug Canyon to Pervenets Canyon					Transect 210
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/30/14	59.13	-178.48	1,241	723	3.4

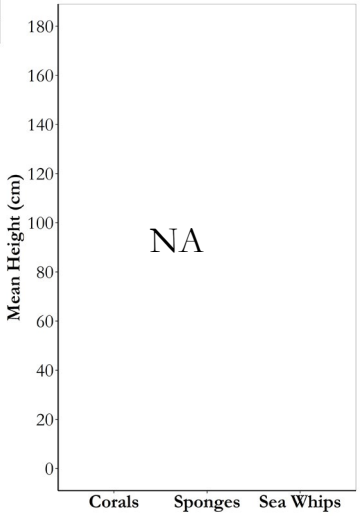
Fish and Crab Composition (n = 107)





Substrate Composition





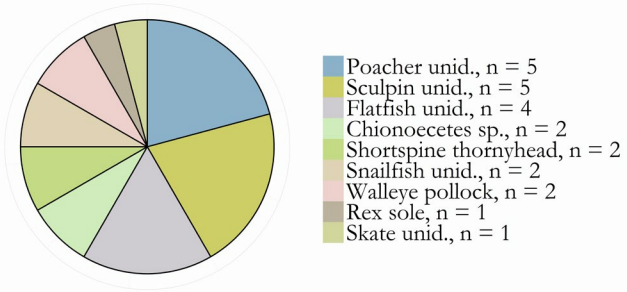
Images

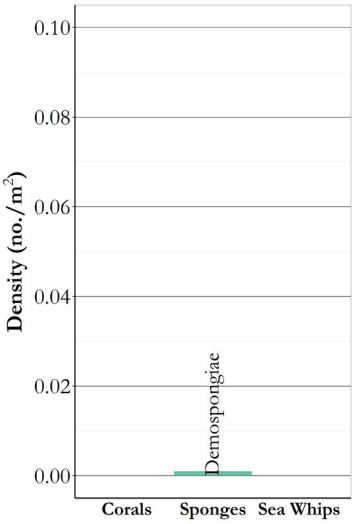
Summary - description of transect

Transect 210: Primary and secondary substrates consisted almost entirely of sand and mud. Of the 107 individuals identified, 73% were grenadiers. Eelpouts ($n = 17$) were the 2nd most abundant group of fishes. Fish density was 0.09 individuals/m^2. Vertical habitat consisted of 1 Demospongiae. No corals were identified.

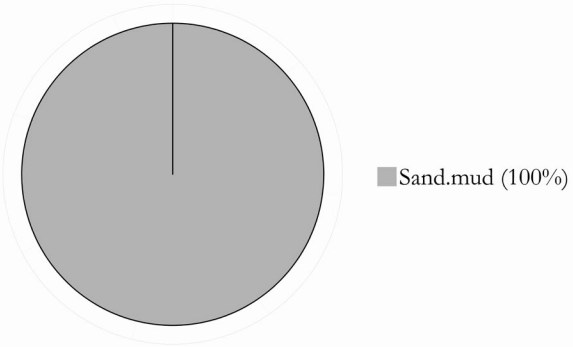
Area: Zhemchug Canyon to Pervenets Canyon					Transect 211
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/30/14	59.18	-178.46	865	359	3.9

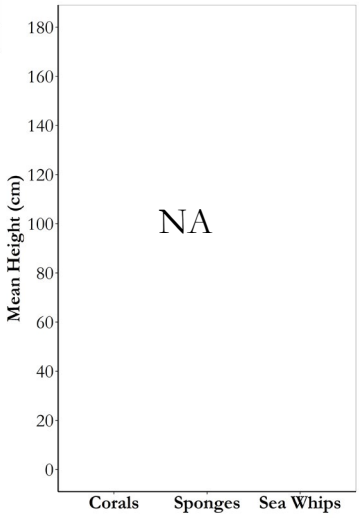
Fish and Crab Composition (n = 24)





Substrate Composition





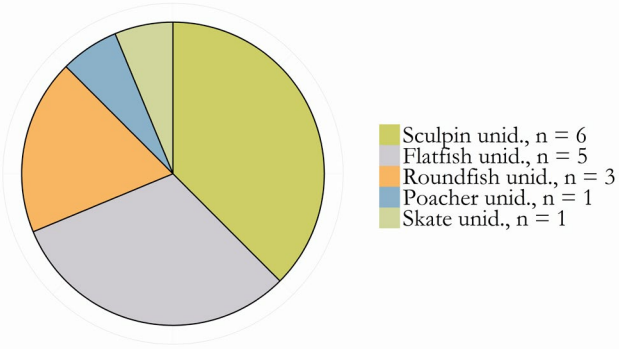
Images

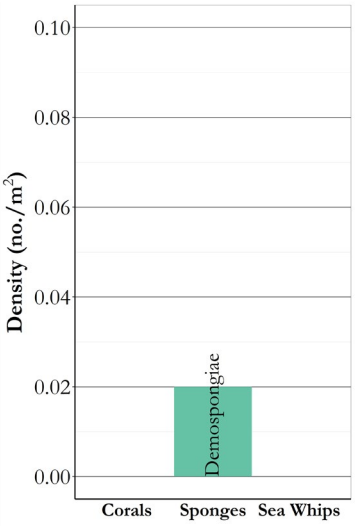
Summary - description of transect

Transect 211: Primary and secondary substrates consisted of sand and mud. Only 24 individuals were identified, and 42% were sculpins and poachers. Species density was 0.03 individuals/m^2. Vertical habitat consisted of 1 Demospongiae. No corals were identified.

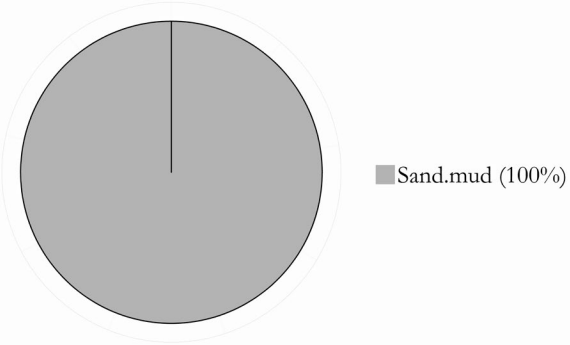
Area: Zhemchug Canyon to Pervenets Canyon					Transect 212
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/30/14	59.19	-178.41	912	215	3.7

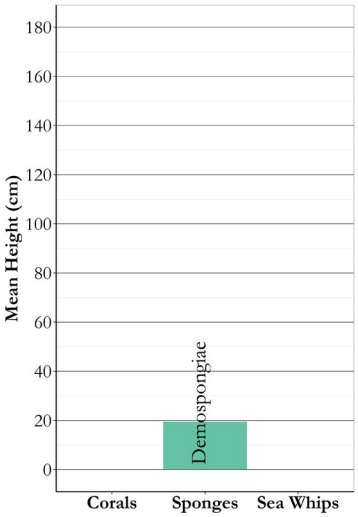
Fish and Crab Composition (n = 16)





Substrate Composition





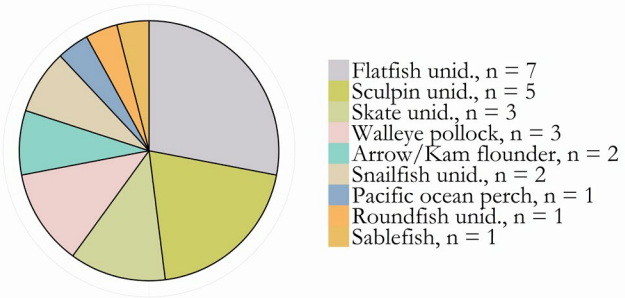
Images

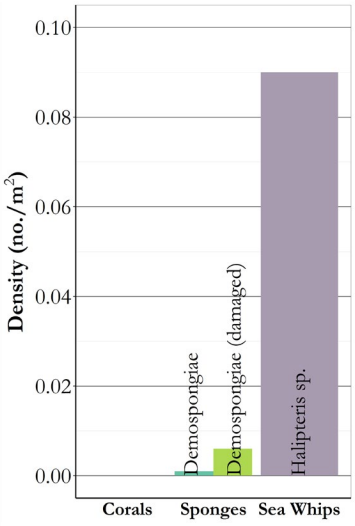
Summary - description of transect

Transect 212: Primary and secondary substrates consisted entirely of sand and mud. Only 16 individuals were identified, and 69% were sculpins and flatfishes. Species density was 0.02 individuals/m^2. Vertical habitat consisted of 18 Demospongiae. Sponge density was 0.02 individuals/m^2. Mean height of 8 measured Demospongiae was 19.4 cm. No corals were identified.

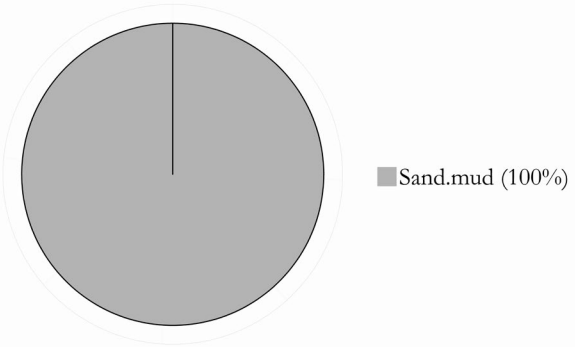
Area: Zhemchug Canyon to Pervenets Canyon					Transect 213
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/30/14	59.27	-178.39	969	305	3.9

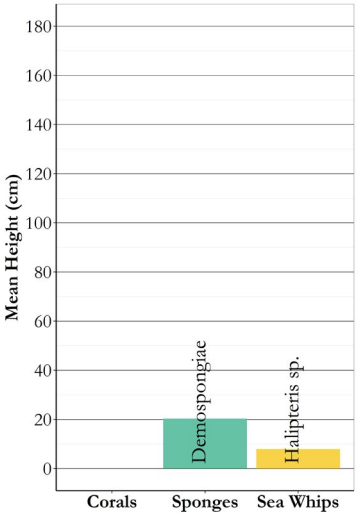
Fish and Crab Composition (n = 25)





Substrate Composition





Images

Summary - description of transect

Transect 213: Primary and secondary substrates consisted of sand and mud. Only 25 individuals were identified, and 52% were sculpins and flatfishes. Species density was 0.03 individuals/m^2. Vertical habitat consisted of 87 sea whips and 7 Demospongiae (1 damaged). Sponge and sea whip density was 0.10 individuals/m^2. One Demospongiae was measured (20.3 cm), and the mean height of 41 measured sea whips was 7.9 cm.

Pervenets Canyon

Twelve transects were completed in Pervenets Canyon. Depths ranged from 261 m to 748 m. Sixteen taxa of fishes and crabs were identified (Table 30). Very little vertical habitat was observed (Table 31). Heights ranged from 3.8 cm to 46.8 cm (Table 32).

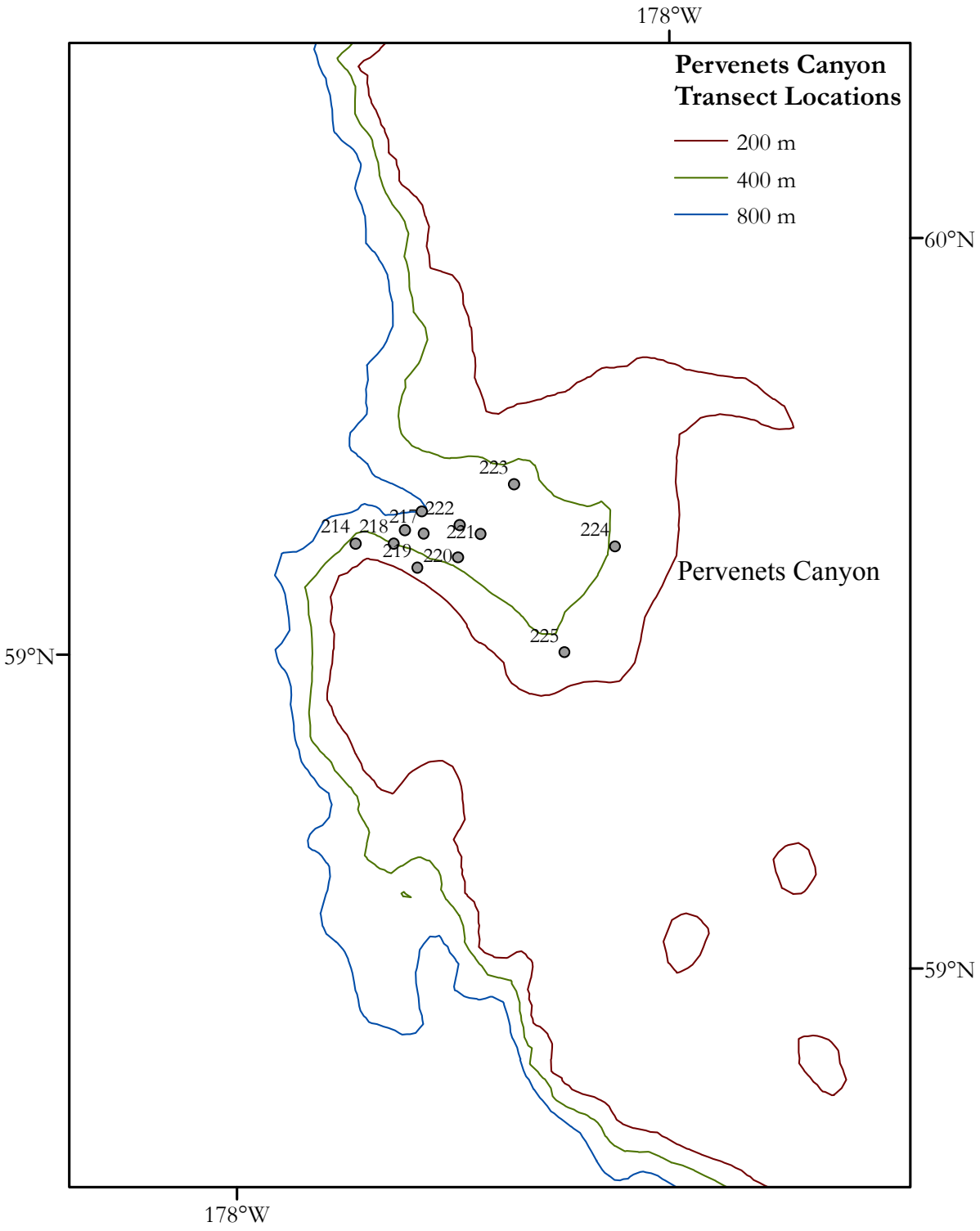


Figure 25. -- Survey transect locations, Pervenets Canyon.

SITE SUMMARY: Pervenets Canyon

Pervenets Canyon is 70 km across on the shelf at its widest point. It narrows to 40 km at the shelf break. There are two main channels that merge to form one channel at 600 m and then join Navarin Canyon at 3,500 m. Pervenets has a volume of 1,700 km^3 which is approximately one third the size of Navarin Canyon to the north (Karl et al. 1996).

Seventy percent of the observed substrates in Pervenets Canyon were comprised of sand (Table 29). Mud was present at 4 transects (29% of observations).

Fish and crab diversity was lower than Zhemchug and Pervenets Canyons with only sixteen taxa identified (Table 30). Popeye grenadier, *Chionoecetes*, and eelpouts were the top three species present.

Vertical habitat diversity was low with only *Halipteris*, Demospongiae, and Hexactinellida present (Table 31, Figs. 26-27). Demospongiae and Hexactinellida both occurred at the same two transects (223, 224). Ninety-eight percent of the *Halipteris* were identified at transect 219 (Fig. 26).

Table 29. -- Summary of substrates observed at transects ($n = 12$) in Pervenets Canyon.

Substrate	Depth range (m)	Number of transects with observed substrate	Percent of observations
Sand.mud	364 - 748	6	53%
Mud*	261 - 561	4	29%
Sand*	273 - 602	2	17%
Sand.gravel	738 - 738	1	1%
Sand.cobble	611 - 611	1	<1%

*Primary and secondary substrates were the same.

Table 30. -- Summary of fishes and crabs identified at transects ($n = 12$) in Pervenets Canyon.

Species/Grouping	Number of occurrences	Number of transects with occurrences	Mean transect depth range (m)	Mean density (individuals/m^2)
Popeye grenadier	465	5	561 - 748	0.09
Chionoecetes sp.	393	8	364 - 748	0.04
Eelpout unid.	232	13	364 - 748	0.01
Poacher unid.	101	10	261 - 748	0.01
Grenadier unid.	94	4	611 - 748	0.01
Giant grenadier	80	6	516 - 738	0.01
Snailfish unid.	63	9	364 - 748	0.01
Sculpin unid.	48	9	273 - 748	<0.01
Flatfish unid.	29	8	261 - 748	<0.01
Roundfish unid.	20	6	273 - 748	<0.01
Skate unid.	17	9	273 - 738	<0.01
Shortspine thornyhead	6	4	494 - 738	<0.01
Arrowtooth/Kamchatka flounder	3	2	273 - 392	<0.01
Golden king crab	3	1	364 - 364	<0.01
Greenland turbot	2	2	516 - 561	<0.01
King crab unid.	1	1	738 - 738	<0.01

Table 31. -- Summary of coral, sponge, and sea whip taxa observed at transects ($n = 12$) in Pervenets Canyon.

Species/Grouping	Number of occurrences	Number of transects with occurrences	Mean transect depth range (m)	Mean density (individuals/m^2)
Halipteris sp.	308	3	273 - 392	0.09
Demospongiae	32	2	273 - 392	0.01
Hexactinellida	7	2	273 - 392	<0.01
Halipteris sp. (damaged)	2	1	494 - 494	<0.01

**Halipteris* sp. (damaged) is not accounted for in the *Halipteris* sp. grouping.

Table 32. -- Summary of coral, sponge, and sea whip mean height collected from transects in Pervenets Canyon.

Species/Grouping	Number measured	Mean height (cm)	Minimum height (cm)	Maximum height (cm)
Halipteris sp.	62	10.0	3.3	34.8
Demospongiae	8	13.4	10.2	21.0
Hexactinellida	2	12.6	11.0	14.1
Halipteris willemoesi	1	95.8	95.8	95.8

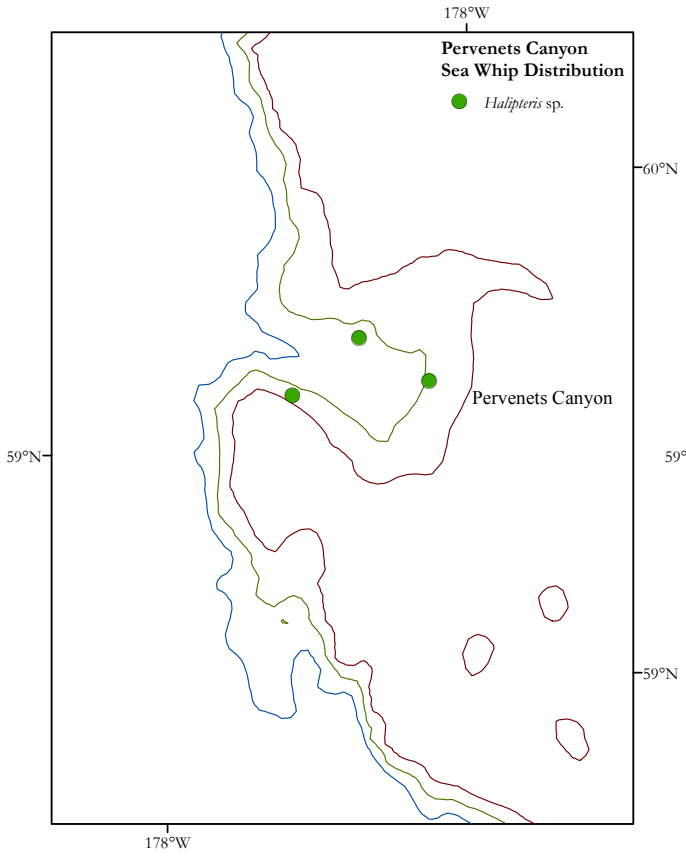


Figure 26. -- Sea whip distribution, Pervenets Canyon.

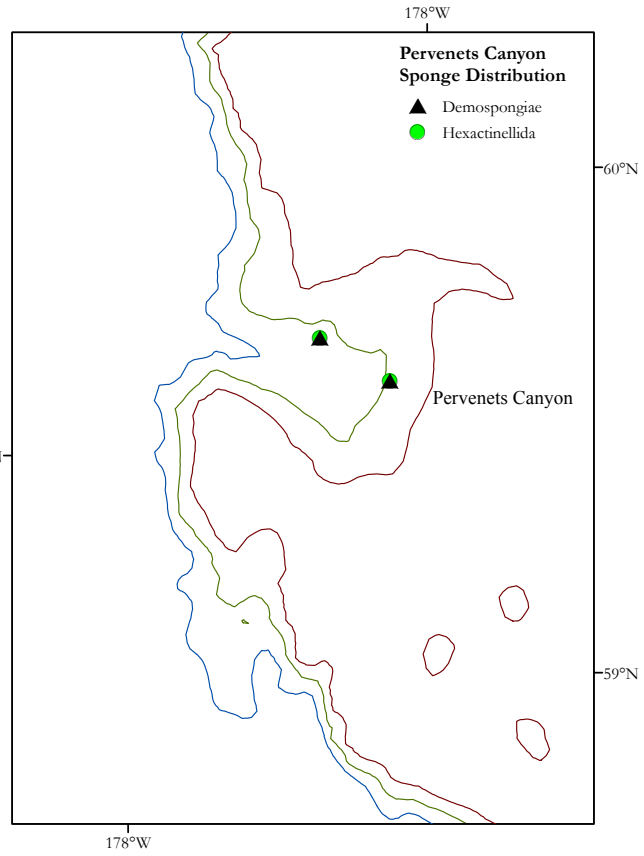
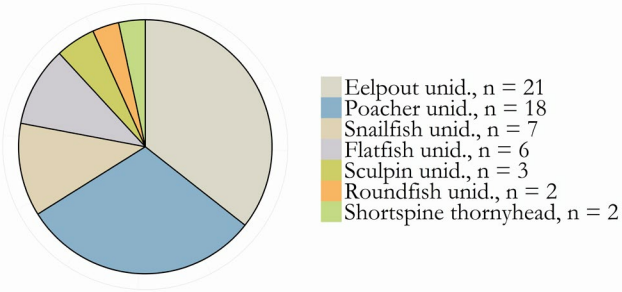
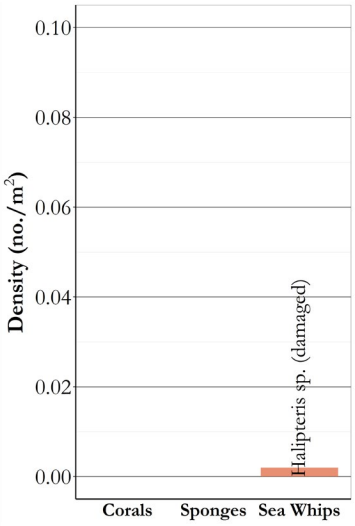


Figure 27. -- Sponge distribution, Pervenets Canyon.

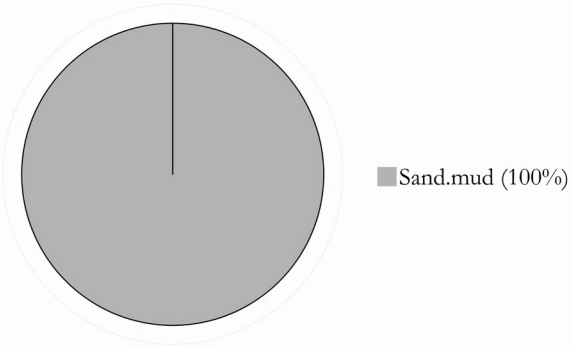
Area: Pervenets Canyon					Transect 214
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/31/14	59.30	-178.33	907	494	3.7

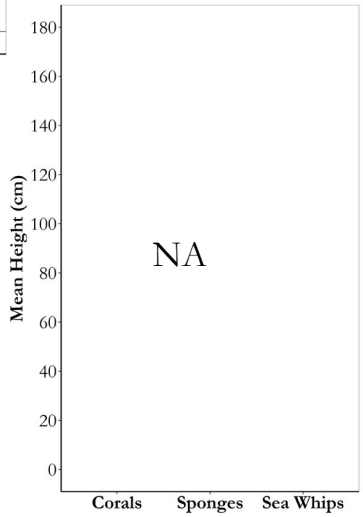
Fish and Crab Composition (n = 59)





Substrate Composition





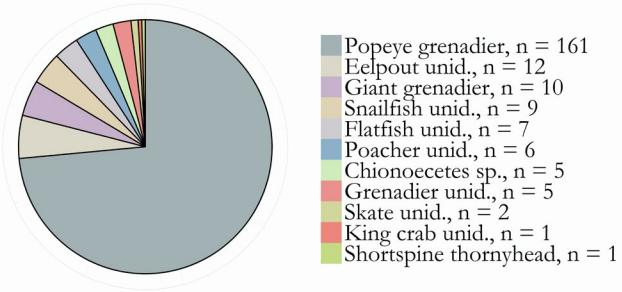
Images

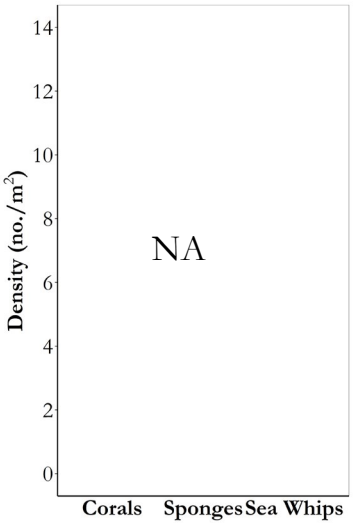
Summary - description of transect

Transect 214: Primary and secondary substrates consisted of sand and mud. Of the 59 individuals counted, 67% were eelpouts and poachers. Species density was 0.07 individuals/m^2. Vertical habitat consisted of 2 damaged *Halipteris* sp. No other corals or sponges were identified.

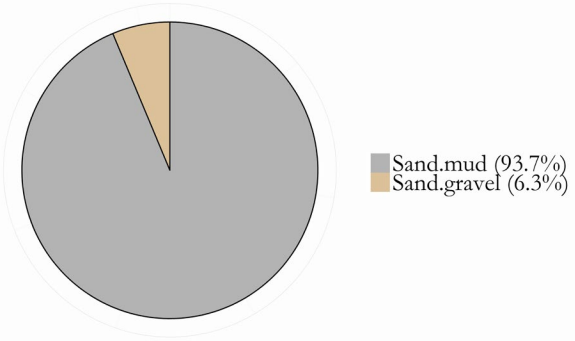
Area: Pervenets Canyon					Transect 215
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/31/14	59.35	-178.21	815	738	3.3

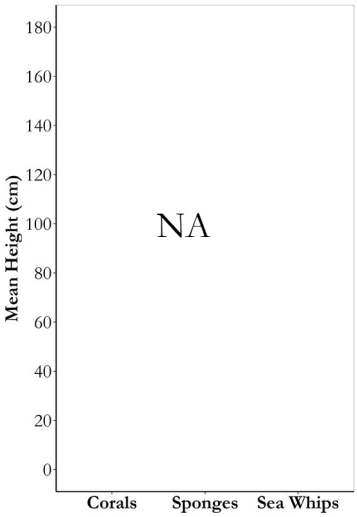
Fish and Crab Composition (n = 219)



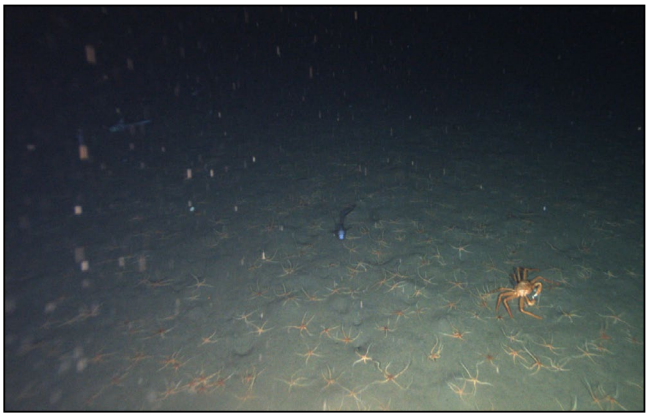


Substrate Composition





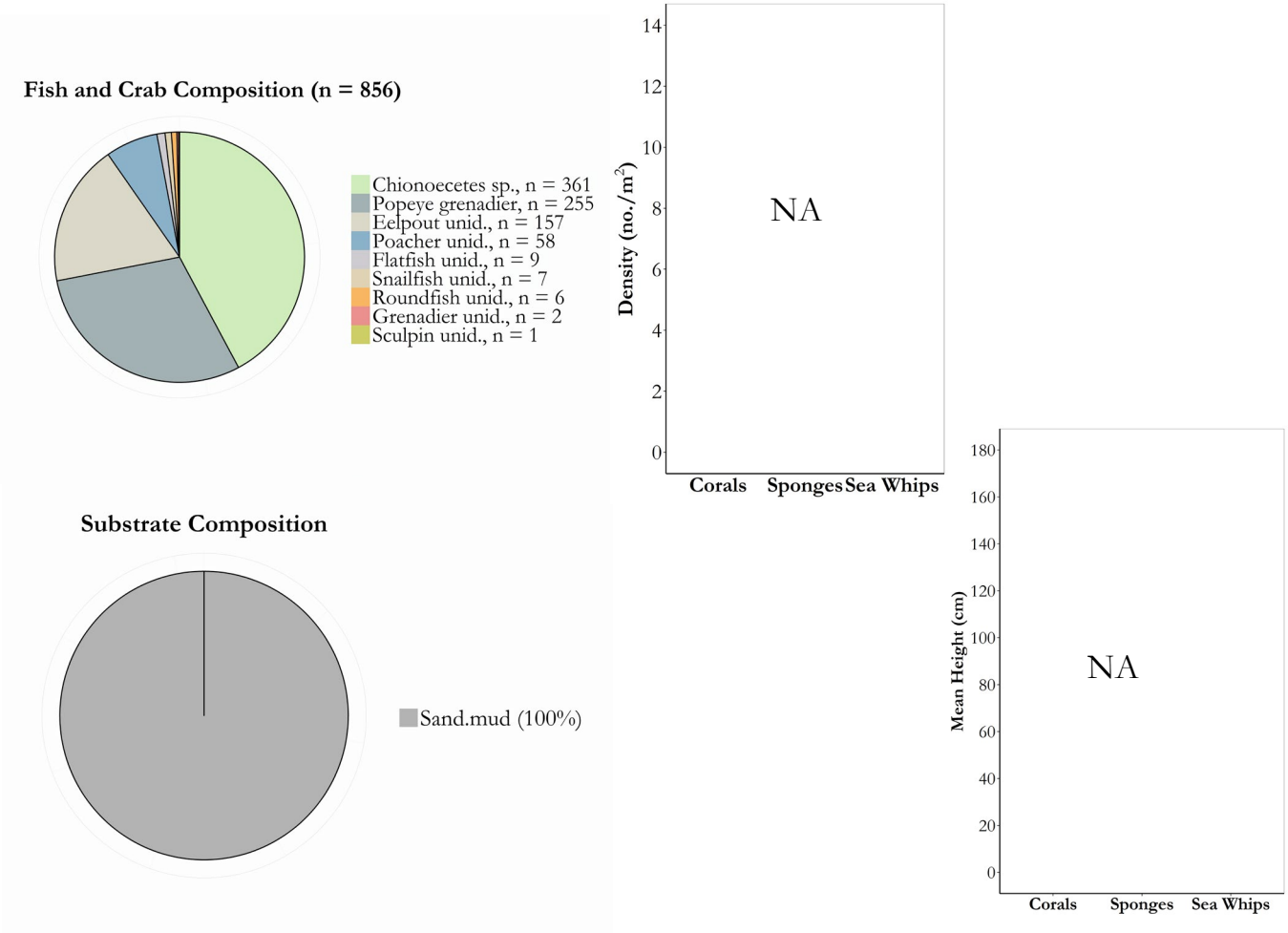
Images



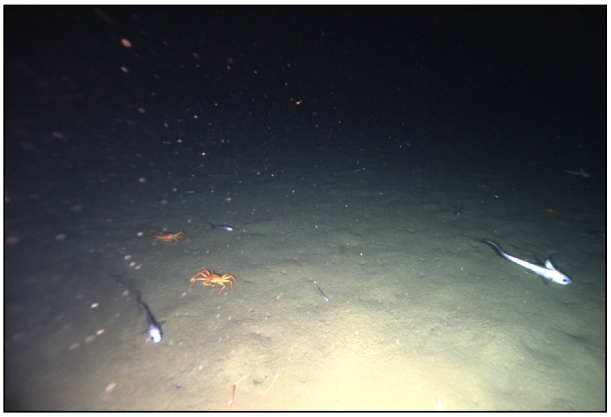
Summary - description of transect

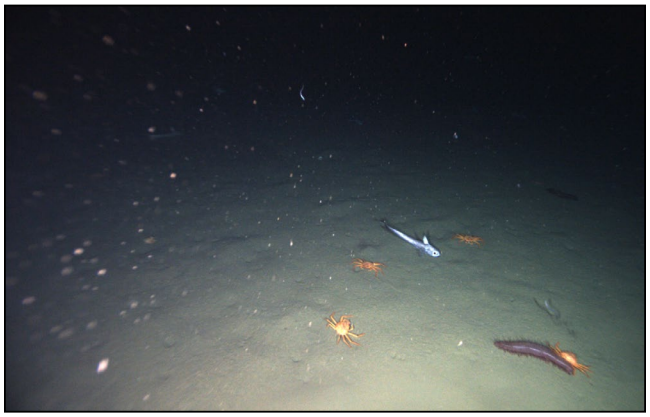
Transect 215: Primary and secondary substrates consisted almost entirely of sand and mud. Approximately 5% of the substrate was sand and gravel. Of the 219 individuals counted, 81% were grenadiers. Two skates were also identified. Species density was 0.27 individuals/m^2. No vertical habitat was identified.

Area: Pervenets Canyon					Transect 216
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/31/14	59.38	-178.19	1,219	748	3.3



Images



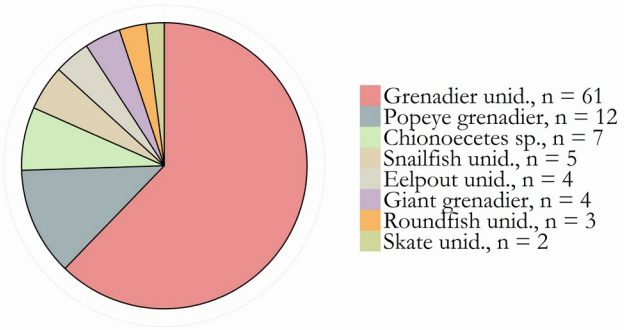


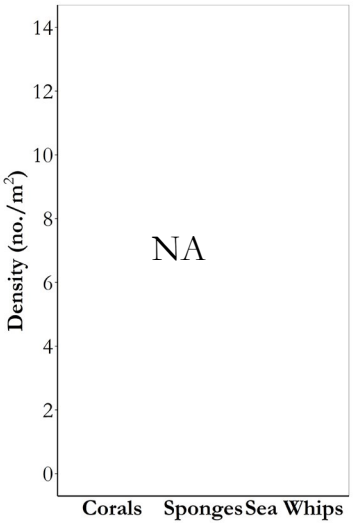
Summary - description of transect

Transect 216: Primary and secondary substrates consisted of sand and mud. Of the 856 individuals counted, 42% were crabs (*Chionoecetes* sp.) and 30% were grenadiers. Species density was 0.70 individuals/m^2. No vertical habitat was identified.

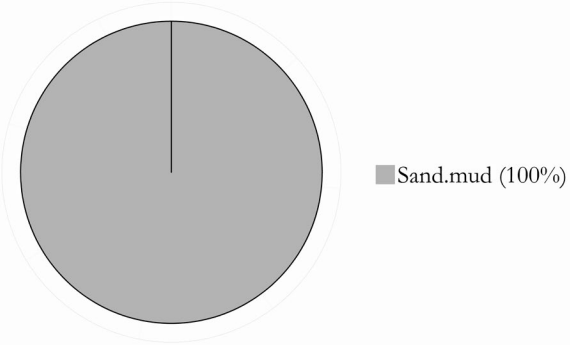
Area: Pervenets Canyon					Transect 217
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/31/14	59.35	-178.16	1,784	696	3.4

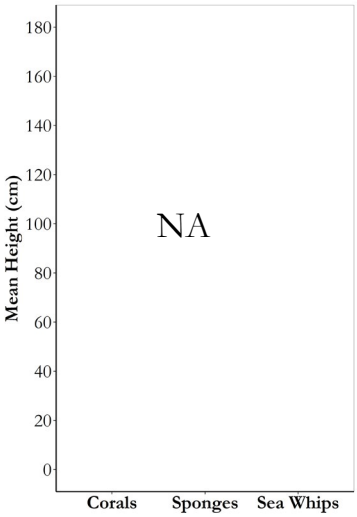
Fish and Crab Composition (n = 98)





Substrate Composition





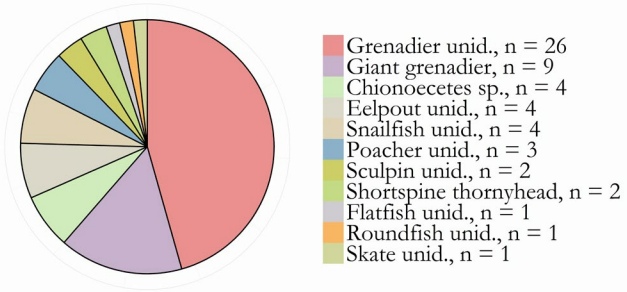
Images

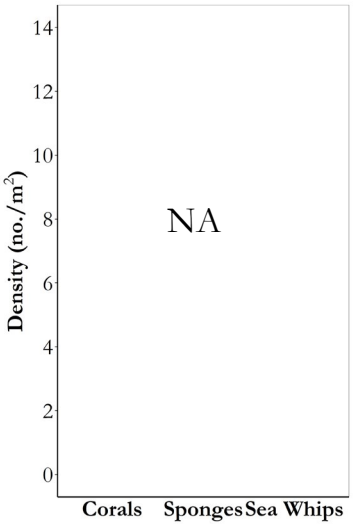
Summary - description of transect

Transect 217: Primary and secondary substrates consisted of sand and mud. Of the 98 individuals counted, 78% were grenadiers. Two skates were also identified. Species density was 0.06 individuals/m^2. No vertical habitat was identified.

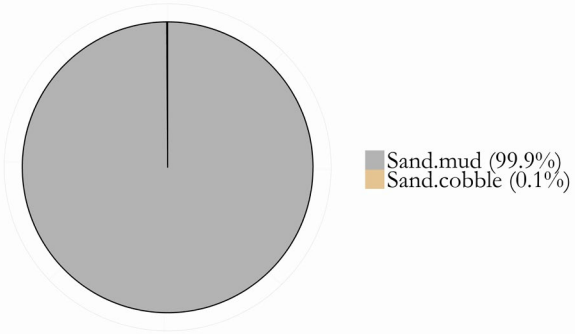
Area: Pervenets Canyon					Transect 218
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/31/14	59.32	-178.23	1,518	611	3.5

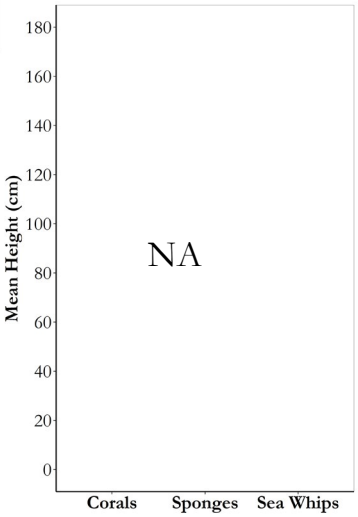
Fish and Crab Composition (n = 57)





Substrate Composition





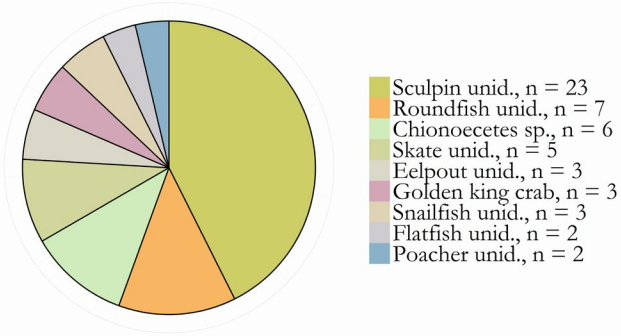
Images

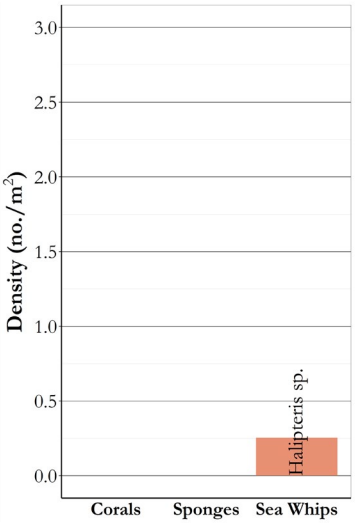
Summary - description of transect

Transect 218: Primary and secondary substrates consisted of sand and mud. Of the 57 individuals counted, 62% were grenadiers. One skate was also identified. Species density was 0.04 individuals/m^2. No vertical habitat was identified.

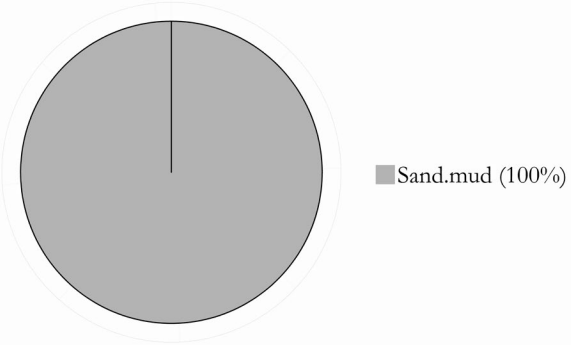
Area: Pervenets Canyon					Transect 219
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/31/14	59.30	-178.14	1,190	364	3.8

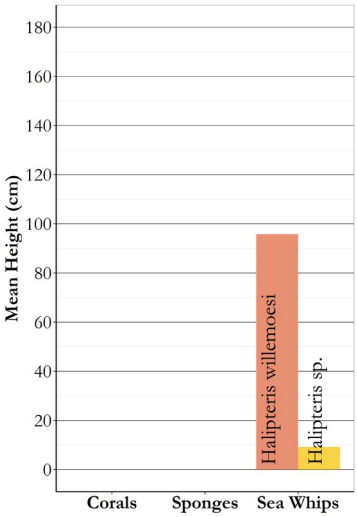
Fish and Crab Composition (n = 54)



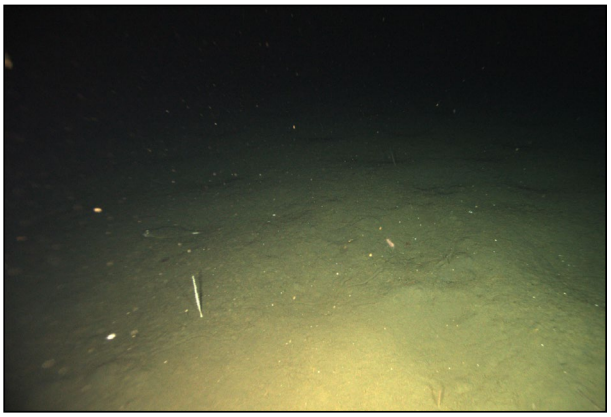


Substrate Composition





Images

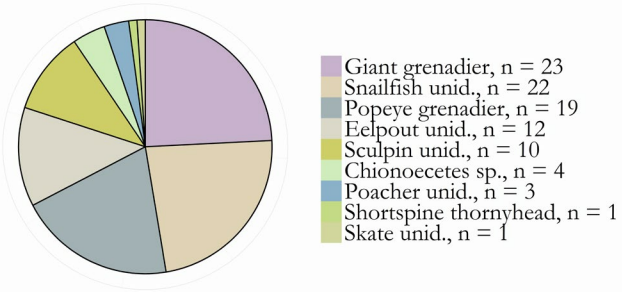


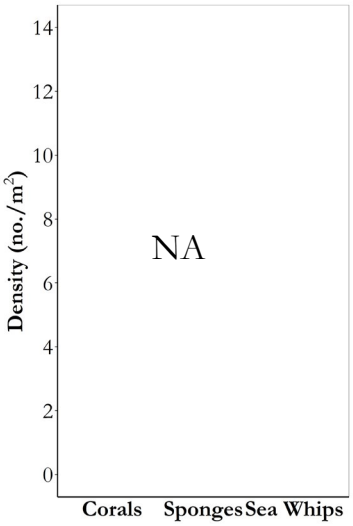
Summary - description of transect

Transect 219: Primary and secondary substrates consisted of sand and mud. Of the 54 individuals counted, 43% were sculpins. Unidentified roundfishes and crabs accounted for another 24% of the observations. Five skates were also identified. Species density was 0.05 individuals/m^2. Vertical habitat consisted of 303 sea whips. Sea whip density was 0.25 individuals/m^2. One *Halipteris willemoesi* was measured (95.8 cm), as well as 59 *Halipteris* sp. (9.2 cm). No other corals or sponges were identified.

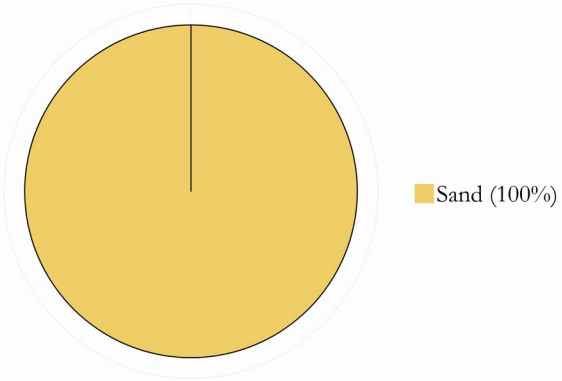
Area: Pervenets Canyon					Transect 220
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/31/14	59.34	-178.04	1,328	602	3.6

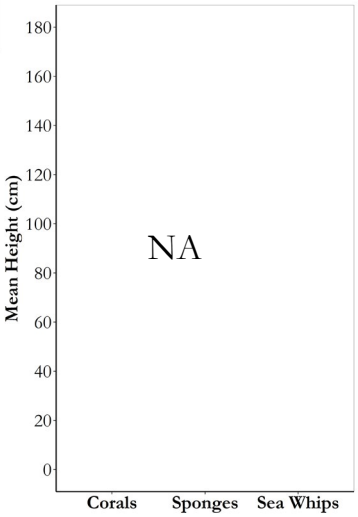
Fish and Crab Composition (n = 95)



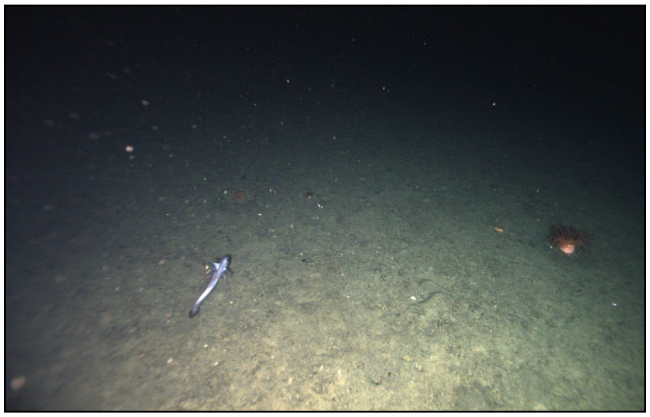


Substrate Composition





Images

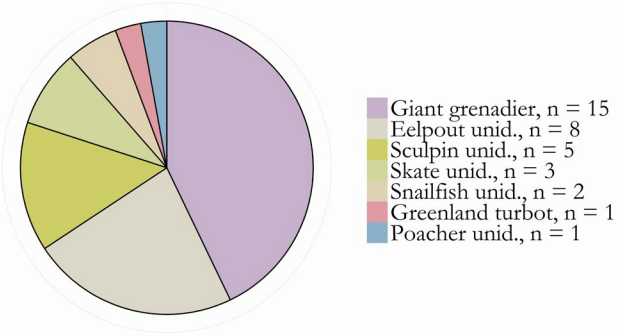


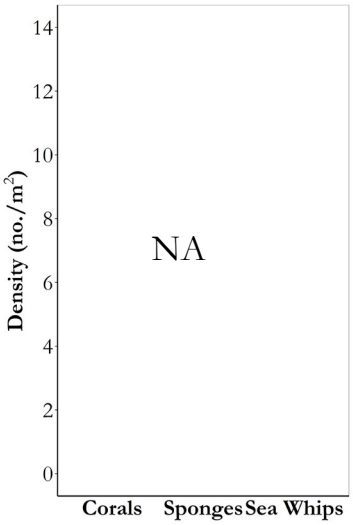
Summary - description of transect

Transect 220: Primary and secondary substrates consisted entirely of sand. Of the 95 individuals counted, 44% were grenadiers. Snailfishes and eelpouts accounted for another 36% of the observations. Species density was 0.07 individuals/m^2. No vertical habitat was identified.

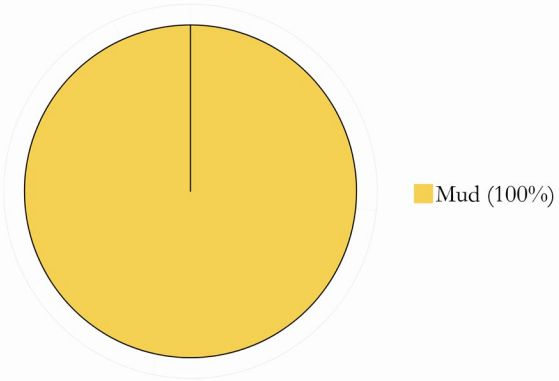
Area: Pervenets Canyon					Transect 221
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/31/14	59.38	-178.01	1,559	516	3.6

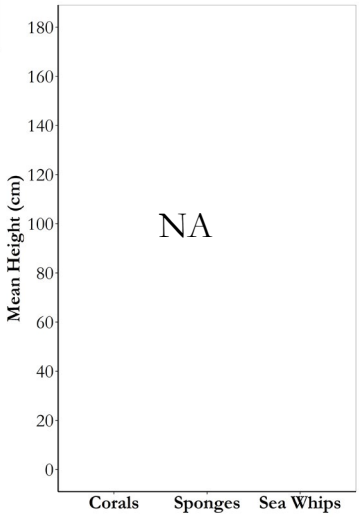
Fish and Crab Composition (n = 35)





Substrate Composition





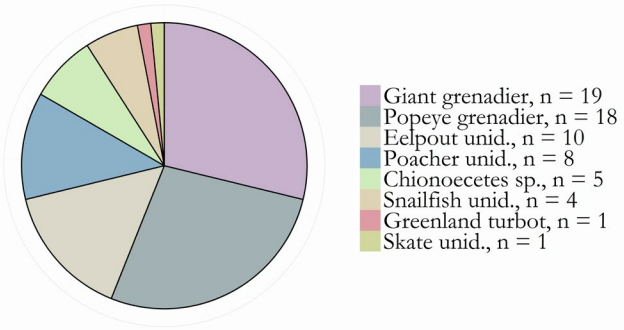
Images

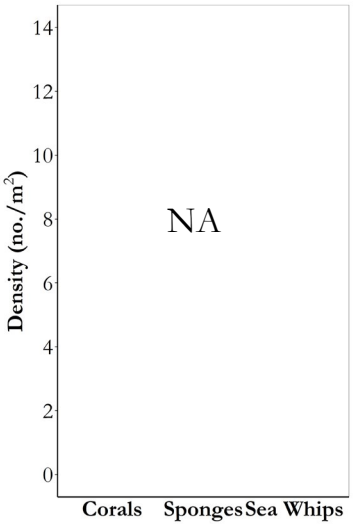
Summary - description of transect

Transect 221: Primary and secondary substrates consisted entirely of mud. Only 35 individuals were counted, and 43% were grenadiers. Eelpouts and sculpins were the next most abundant groups. Species density was 0.02 individuals/m^2. No vertical habitat was identified.

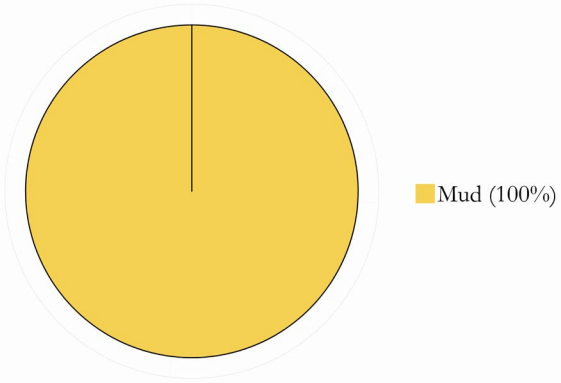
Area: Pervenets Canyon					Transect 222
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/31/14	59.38	-178.07	2,052	561	3.6

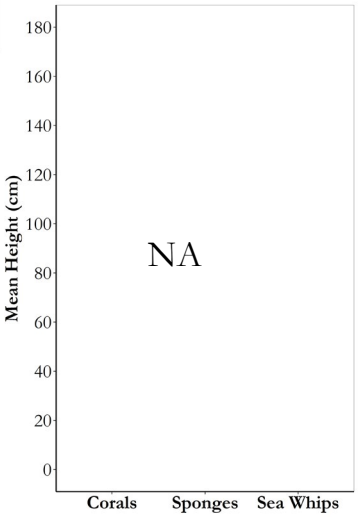
Fish and Crab Composition (n = 66)



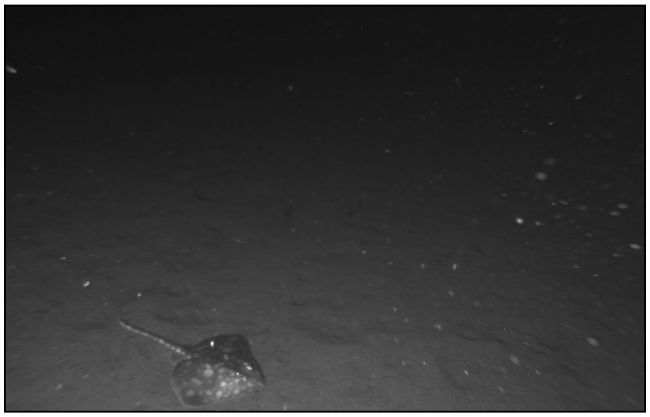


Substrate Composition





Images

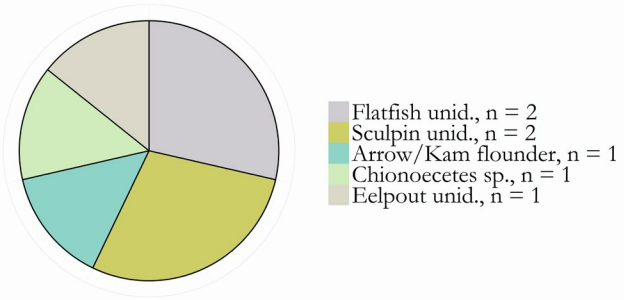


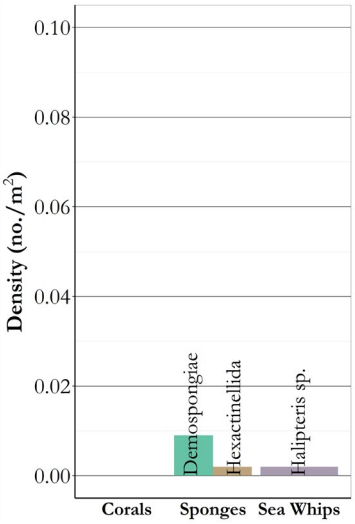
Summary - description of transect

Transect 222: Primary and secondary substrates consisted entirely of mud. Of the 66 individuals counted, 56% were grenadiers. Eelpouts and poachers accounted for another 27% of the observations. Species density was 0.03 individuals/m^2. No vertical habitat was identified.

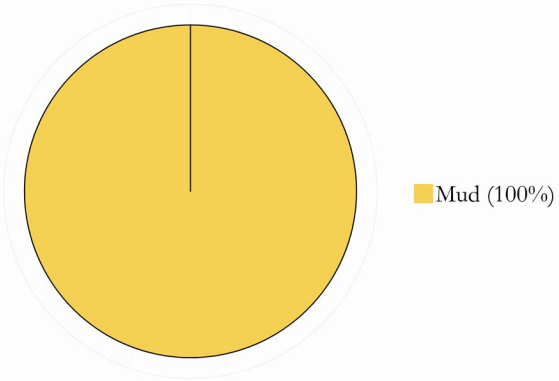
Area: Pervenets Canyon					Transect 223
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/31/14	59.46	-177.97	1,946	392	3 7

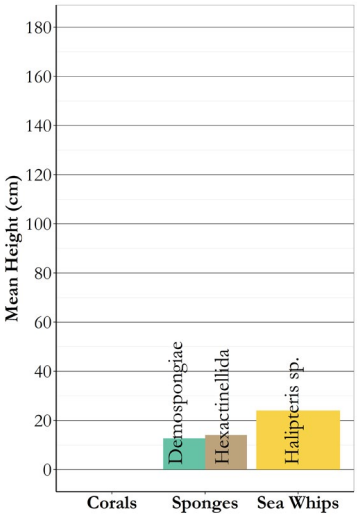
Fish and Crab Composition (n = 7)



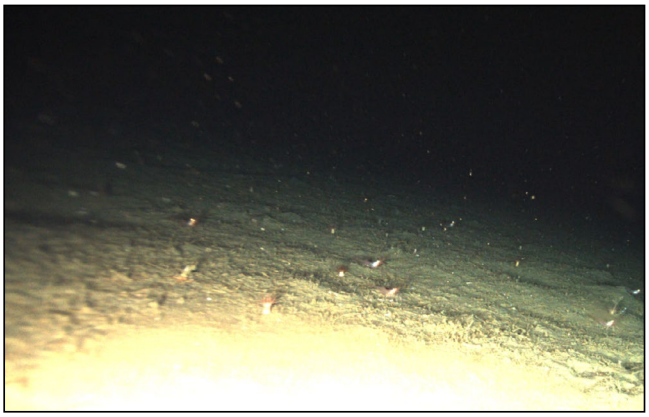


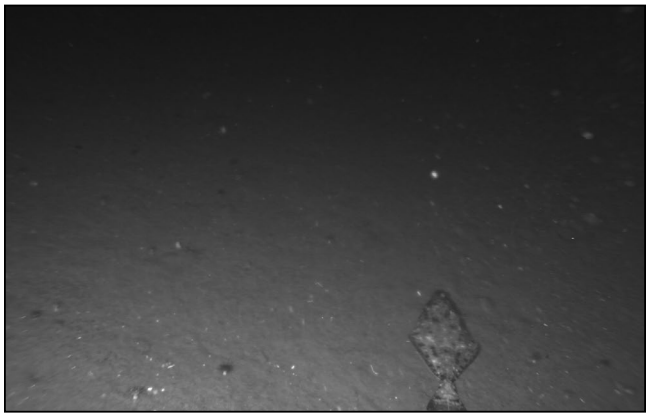
Substrate Composition





Images



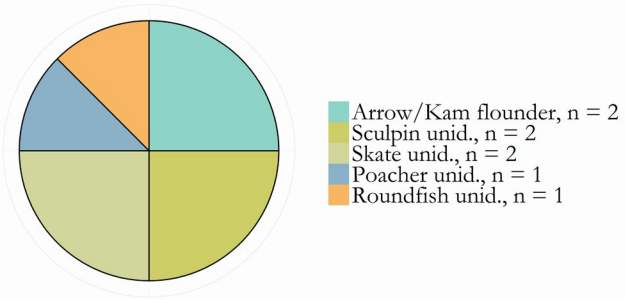


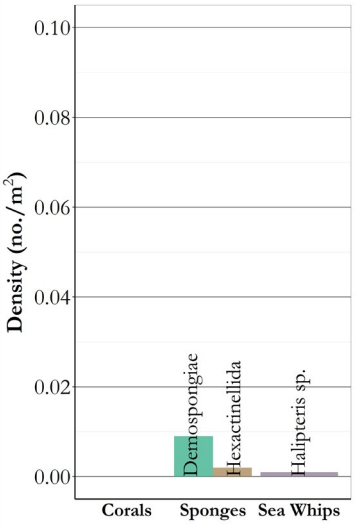
Summary - description of transect

Transect 223: Primary and secondary substrates consisted entirely of mud. Only 7 individuals were counted, and 72% were sculpins and flatfishes. One eelpout and 1 crab were also identified. Species density was very low (< 0.01 individuals/m^2). Vertical habitat consisted of 4 sea whips, 18 Demospongiae and 4 Hexactinellida. Sponge and sea whip density was 0.01 individuals/m^2. Mean height for 7 measured Demospongiae was 12.7 cm. One Hexactinellida was measured (14.1 cm), and 3 sea whips (24.0 cm).

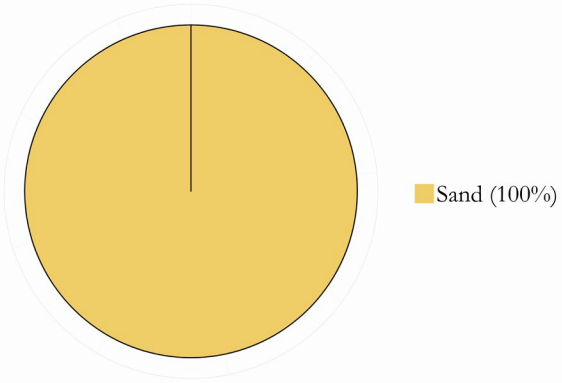
Area: Pervenets Canyon					Transect 224
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/1/14	59.43	-177.63	1,593	273	3.5

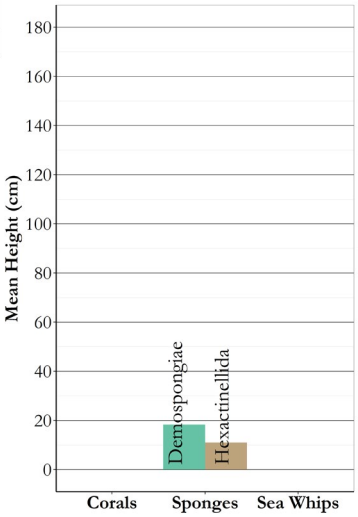
Fish and Crab Composition (n = 8)





Substrate Composition





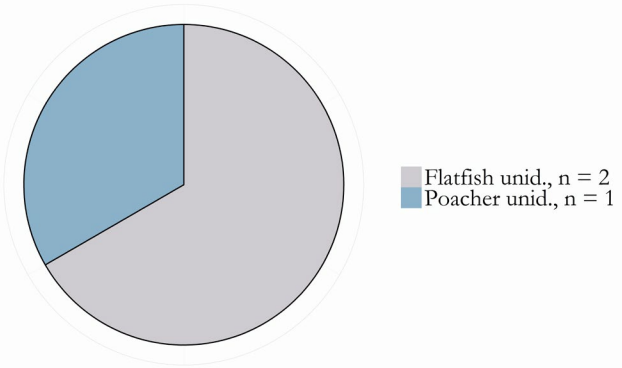
Images

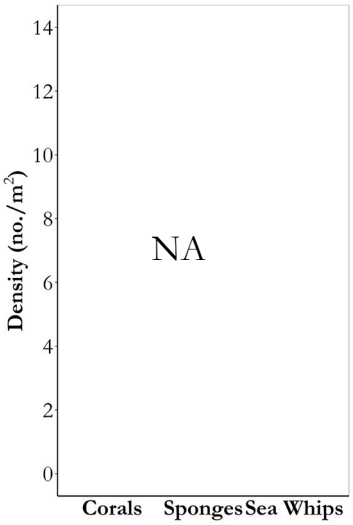
Summary - description of transect

Transect 224: Primary and secondary substrates consisted of sand. Fish density was low (0.01 individuals/m^2), with only 8 individuals counted for the entire transect. Skates, sculpins and flatfishes were found in equal numbers ($n = 2$ each). Skate egg cases were observed in this transect. Vertical habitat density was 0.01 individuals/m^2. One sea whip was identified, as well as 14 Demospongiae and 3 Hexactinellida. Mean heights for 3 measured Demospongiae and Hexactinellida were 18.3 cm and 11.0 cm, respectively.

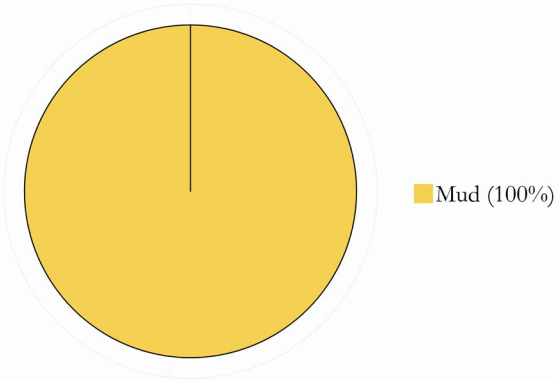
Area: Pervenets Canyon					Transect 225
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/1/14	59.26	-177.66	735	261	3.4

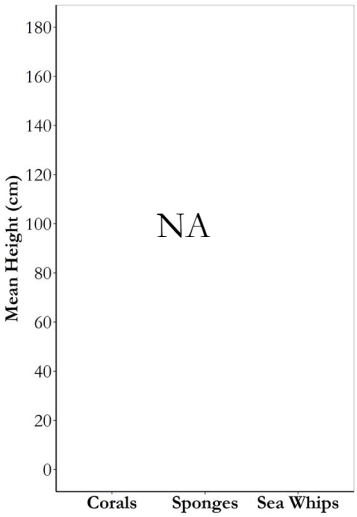
Fish and Crab Composition (n = 3)



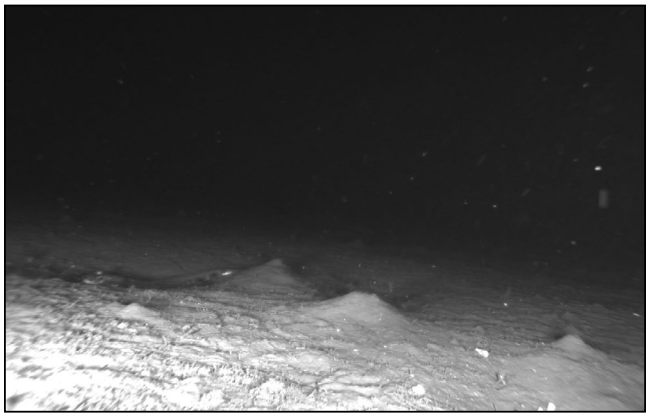


Substrate Composition





Images



Summary - description of transect

Transect 225: Primary and secondary substrates consisted of mud. Only 3 fish were identified resulting in a low density (< 0.01 individuals/m^2). No vertical habitat was identified.

Sixty-seven transects were completed on the Outer Shelf. Depths ranged from 91 m to 513 m. Twenty-eight taxa of fishes and crabs were identified (Table 34). Vertical habitat was dominated by Demospongiae and sea whips (Table 35). Heights ranged from 2.7 cm to 230.1 cm (Table 36).

Outer Shelf

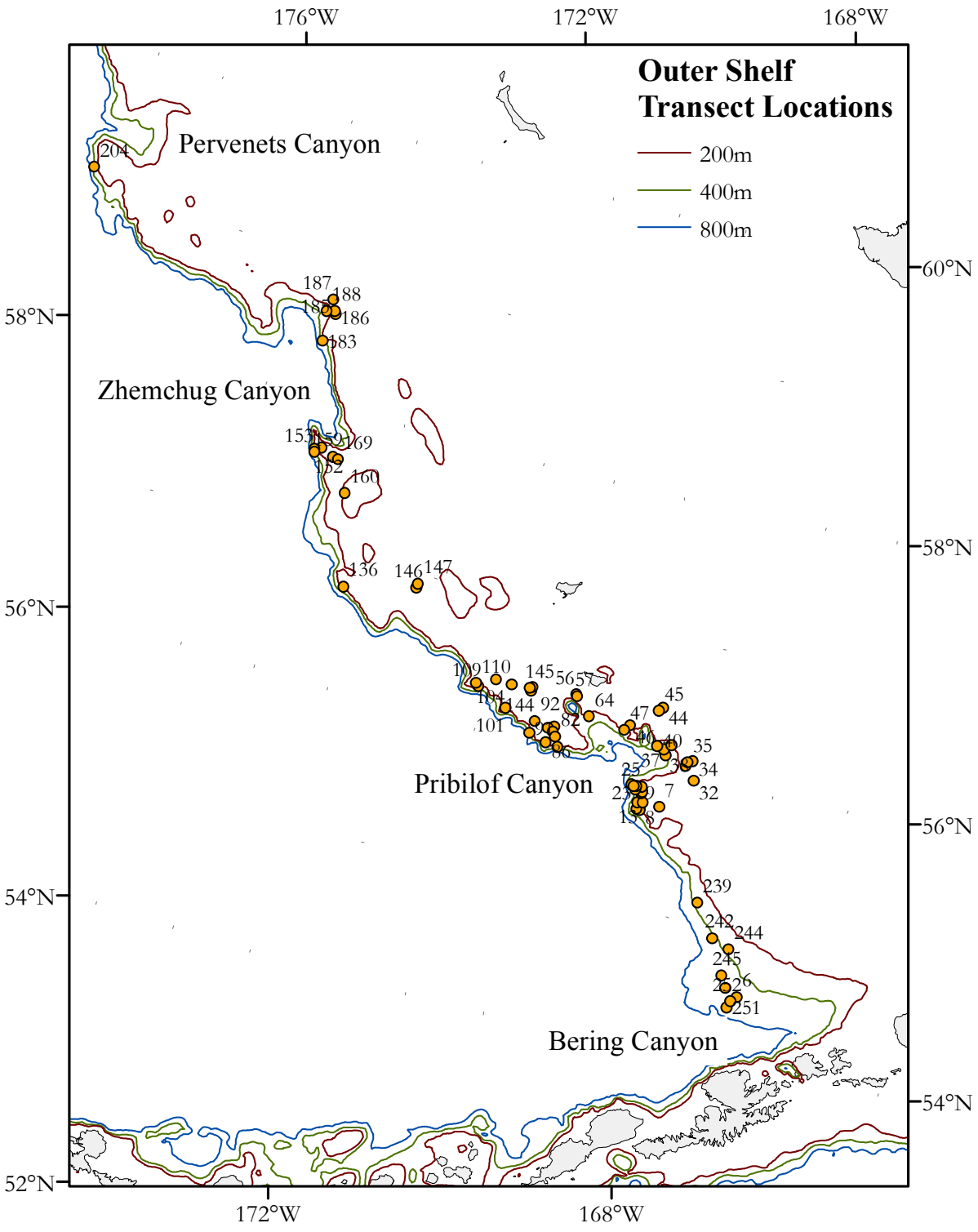


Figure 28. -- Survey transect locations, Outer Shelf.

SITE SUMMARY: Outer Shelf

Transects in the Outer Shelf region had the largest spread in latitude, occurring as far south as 166.99°N and as far north as 178.29°N (Fig. 28). The boundaries of the outer shelf are defined in Sigler et al. 2015.

The Outer Shelf substrate was dominated by sand and mud. Over 80% of the primary substrate was identified as sand (Table 33). Boulders and bedrock were observed in less than 2% of the images.

Chionoecetes sp. were identified more than any other fish or crab occurring at 49 of 67 transects (Table 34). Although *Halipteris* sp. occurred at more transects (25) than Demospongiae (29), the frequency of occurrences of Demospongiae was almost twice as much as *Halipteris* (Table 35). *Halipteris willemoesi* and Demospongiae dominated the vertical habitat with heights ranging from 4-230 cm and 10-73 cm, respectively.

Sea whips and sponges were distributed throughout the region (Figs. 29, 31). Primnoidae (*Plumarella* sp.) was the only coral present, occurring at transect 40 (Fig. 30).

Table 33. -- Summary of substrates identified at transects ($n = 67$) in the Outer Shelf region.

Substrate	Depth range (m)	Number of transects with observed substrate	Percent of observed substrate
Sand.mud	91 - 451	57	72%
Mud*	278 - 513	8	11%
Sand*	110 - 174	14	6%
Mixed coarse	174 - 252	6	6%
Sand.mixed coarse	171 - 181	4	2%
Boulder.high bedrock	110 - 110	1	1%
Mixed coarse.sand	181 - 181	1	1%
Gravel.mixed coarse	181 - 181	1	<1%
Sand.gravel	146 - 181	2	<1%
Sand.boulder	110 - 171	4	<1%
High bedrock.boulder	110 - 110	1	<1%
Sand.cobble	158 - 158	1	<1%
Boulder*	110 - 110	1	<1%

*Primary and secondary substrates were the same.

Table 34. -- Summary of fishes and crabs identified at transects ($n = 67$) in the Outer Shelf region.

Species/Grouping	Number of occurrences	Number of transects with occurrences	Mean transect depth range (m)	Mean density (individuals/m^2)
Chionoecetes sp.	1,337	49	91 - 252	0.02
Eelpout	708	45	91 - 513	0.02
Sculpin	271	49	91 - 252	0.01
Roundfish unid.	230	47	110 - 513	<0.01
Flatfish unid.	219	48	91 - 451	<0.01
Pacific ocean perch	103	6	110 - 252	0.01
Crab unid.	69	19	92 - 206	<0.01
Snailfish	59	10	140 - 513	0.01
Poacher	58	32	116 - 513	<0.01
Northern rockfish	57	1	110 - 110	0.04
Searcher	49	10	110 - 212	<0.01
Shortspine thornyhead	39	7	321 - 513	0.01
Arrowtooth/Kamchatka flounder	31	22	111 - 451	<0.01
Flathead sole	26	20	112 - 451	<0.01
Skate	24	18	112 - 472	<0.01
Rockfish unid.	22	3	110 - 212	0.01
Walleye pollock	20	9	117 - 164	<0.01
Harlequin rockfish	11	1	110 - 110	0.01
Pacific cod	7	5	133 - 164	<0.01
Pacific halibut	7	6	116 - 453	<0.01
Cod/pollock unid.	6	6	111 - 164	<0.01
Golden king crab	6	2	212 - 252	<0.01
Rex sole	6	6	117 - 371	<0.01
Giant grenadier	5	4	451 - 513	<0.01
Sablefish	3	1	137 - 137	<0.01
King crab unid.	2	2	206 - 252	<0.01
Blackspotted rockfish	1	1	110 - 110	<0.01
Dusky rockfish	1	1	110 - 110	<0.01

Table 35. -- Summary of coral, sponge, and sea whip taxa identified at transects ($n = 67$) in the Outer Shelf region.

Species/Grouping	Number of occurrences	Number of transects with occurrences	Mean transect depth range (m)	Mean density (individuals/m^2)
Demospongiae	17,261	25	110 - 513	0.54
Halipteris sp.	9,588	29	91 - 453	0.23
Halipteris sp. (damaged)*	790	25	91 - 278	0.03
Plumarella sp.	123	1	212 - 212	0.07
Hexactinellida	57	7	110 - 212	0.01
Demospongiae (damaged)	51	2	206 - 252	0.02
Porifera	2	1	150 - 150	<0.01
Primnoidae	1	1	212 - 212	<0.01

**Halipteris* sp. (damaged) is not accounted for in the *Halipteris* sp. grouping.

Table 36. -- Summary of coral, sponge, and sea whip mean height data from transects in the outer shelf region.

Species/Grouping	Number measured	Mean height (cm)	Minimum height (cm)	Maximum height (cm)
Halipteris willemoesi	852	109.4	4.1	230.1
Demospongiae	665	18.9	10.0	73.1
Halipteris sp.	308	12.6	2.7	133.0
Plumarella sp.	48	16.2	6.5	29.6
Hexactinellida	25	15.7	10.2	35.3

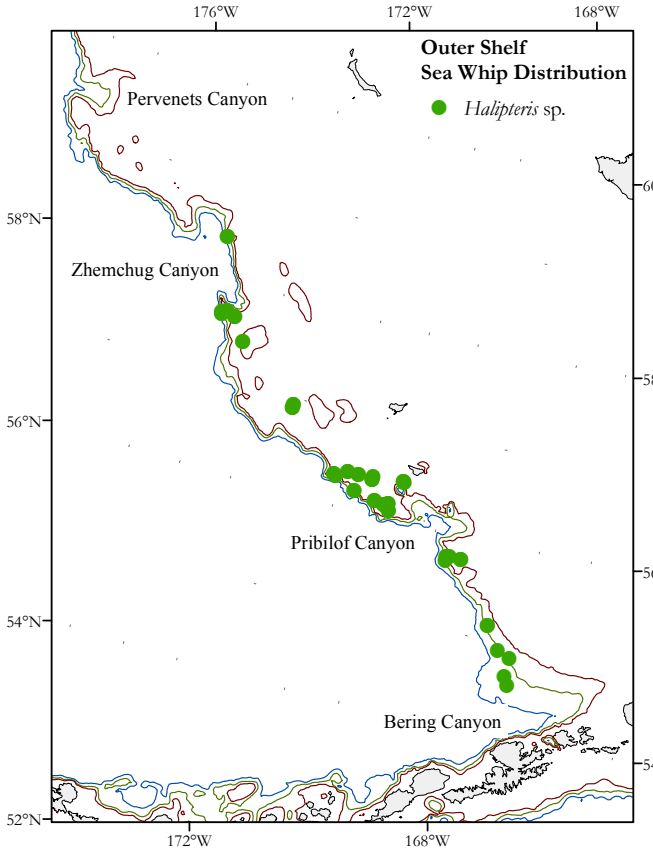


Figure 29. -- Sea whip distribution, Outer Shelf.

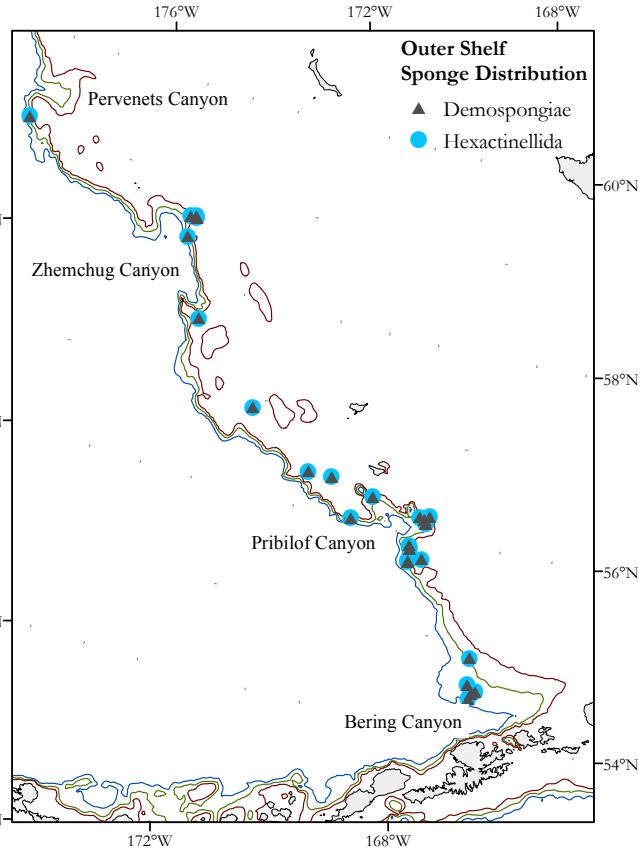


Figure 31. -- Sponge distribution, Outer Shelf.

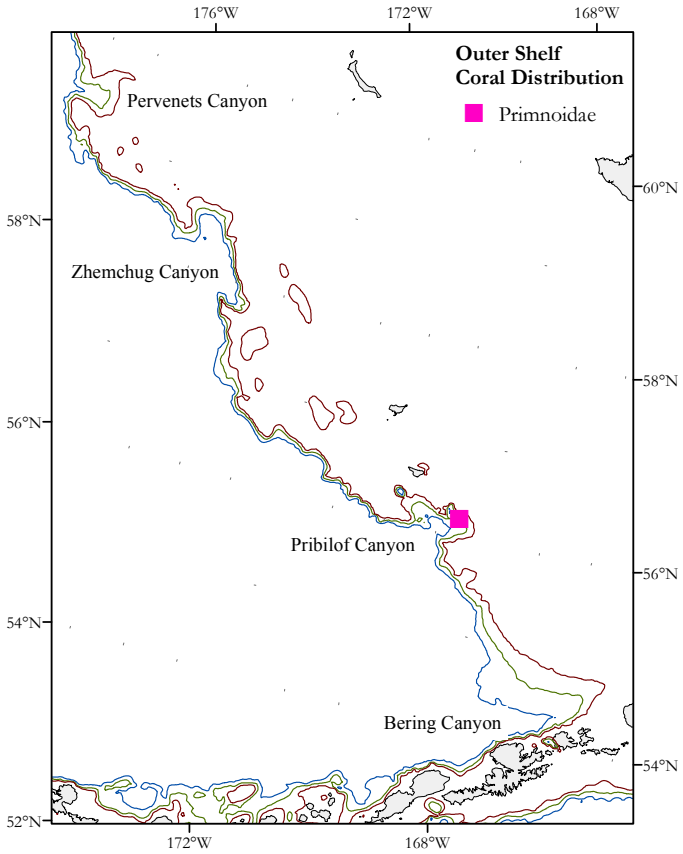
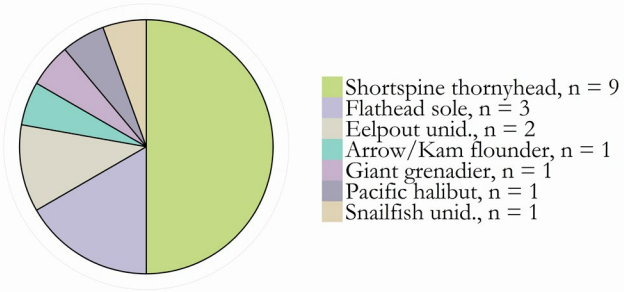
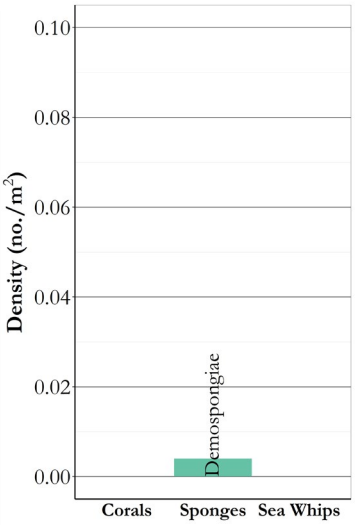


Figure 30. -- Coral distribution, Outer Shelf..

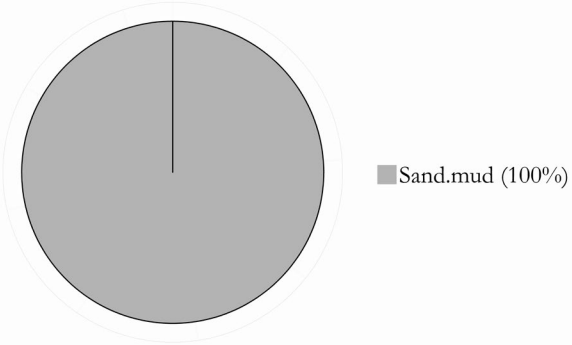
Area: Outer Shelf					Transect 6
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/12/14	54.53	-166.96	724	451	3.7

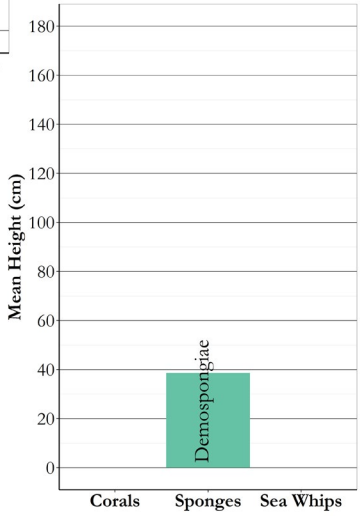
Fish and Crab Composition (n = 18)





Substrate Composition





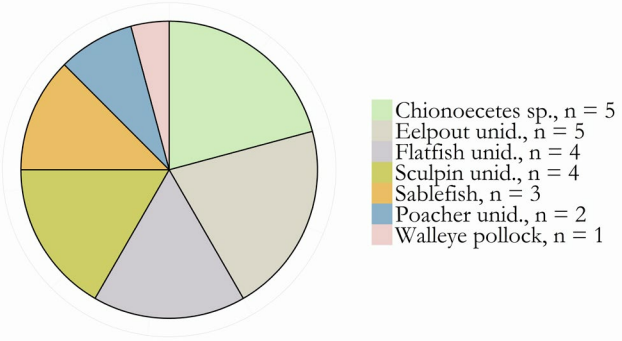
Images

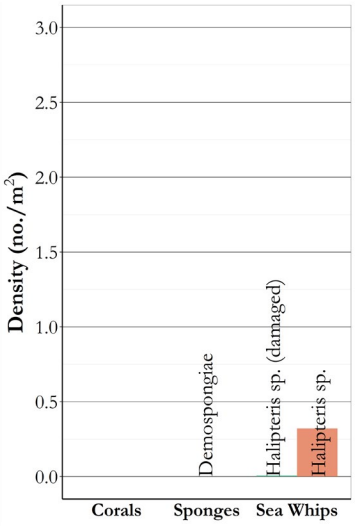
Summary - description of transect

Transect 6: Primary and secondary substrates consisted of sand and mud. Transect 6 had overall low species abundance (0.03 individuals/m^2) with only 18 fishes identified. Shortspine thornyheads were 50% of the species identified, with eelpouts and flatfishes accounting for another 40% of the observations. Fish density was 0.02 individuals/m^2. Demospongiae occurred at low frequencies ($n = 3$), and averaged 38.6 cm in height. No corals were identified.

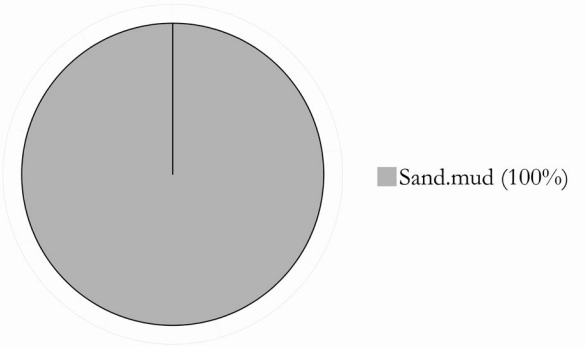
Area: Outer Shelf					Transect 7
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/12/14	55.77	-168.42	3,441	137	4.4

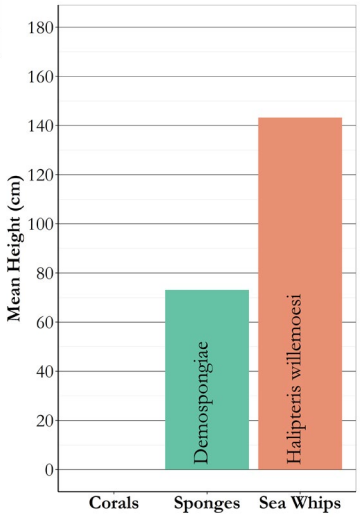
Fish and Crab Composition (n = 24)



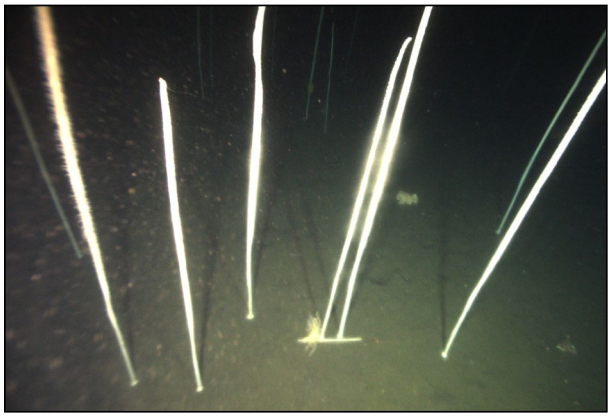


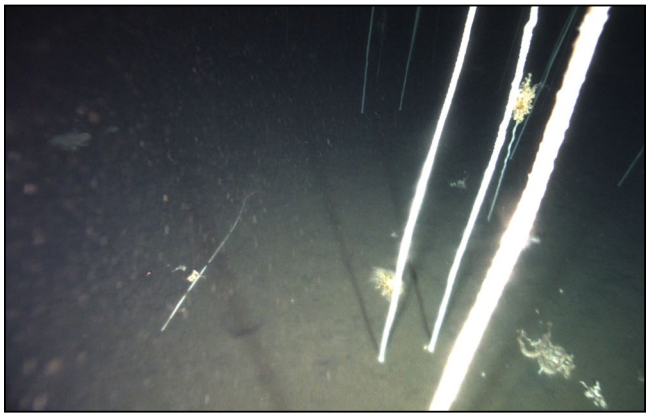
Substrate Composition





Images



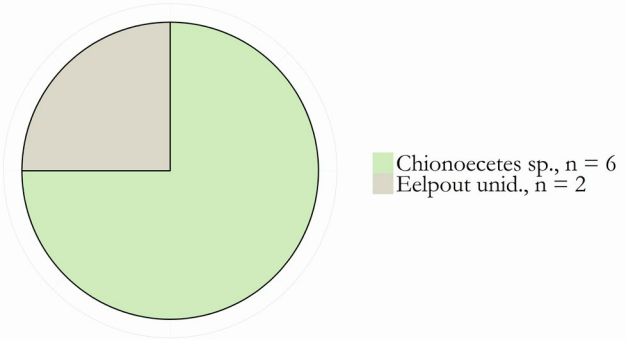


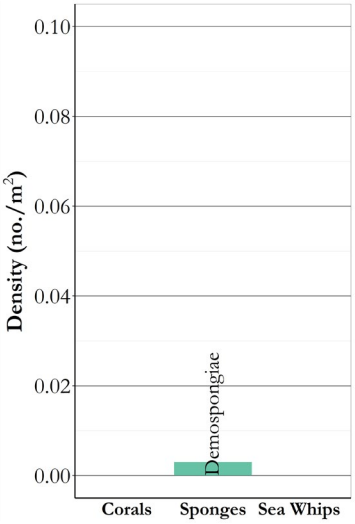
Summary - description of transect

Transect 7: Primary and secondary substrates consisted of sand and mud, respectively. Five crabs and 19 fish were counted for this transect, resulting in a density of 0.01 individuals/m^2. Eelpouts and *Chionoecetes* sp. accounted for 42% of all species seen. Vertical habitat consisted of 1132 sea whips (26 damaged), and 1 Demospongiae. Sea whip and sponge density was 0.33 individuals/m^2. The mean height of 256 measured sea whips was 143.3 cm. Although the Demospongiae was alone, it contributed 73.1 cm to the vertical habitat. No other corals were identified.

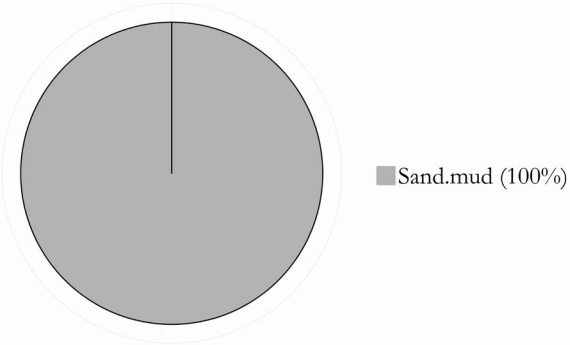
Area: Outer Shelf					Transect 8
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/12/14	55.73	-168.66	367	140	4.2

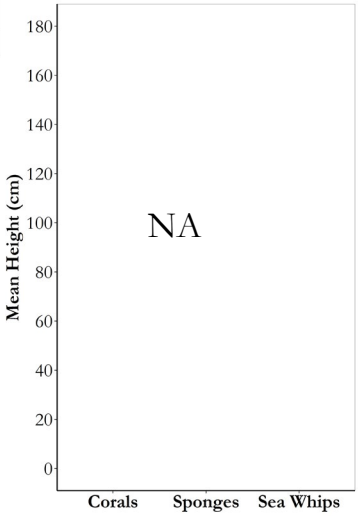
Fish and Crab Composition (n = 8)



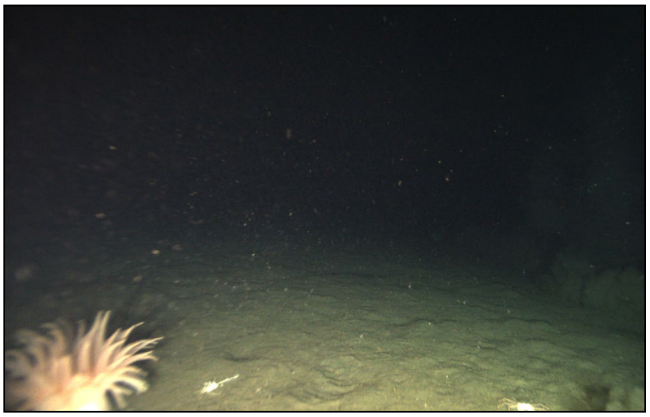


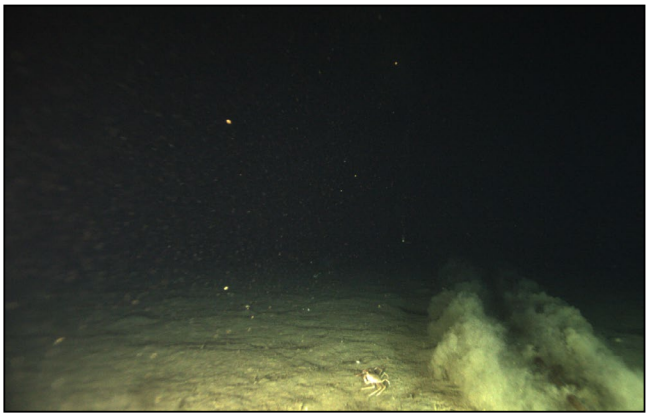
Substrate Composition





Images



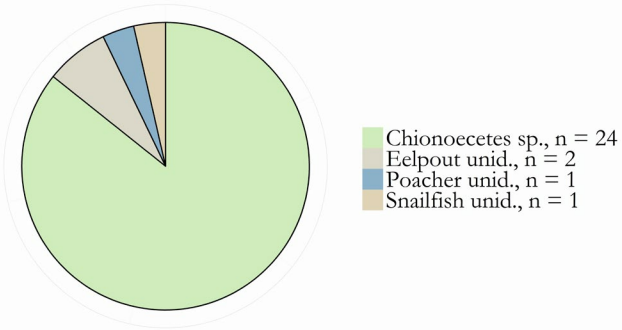


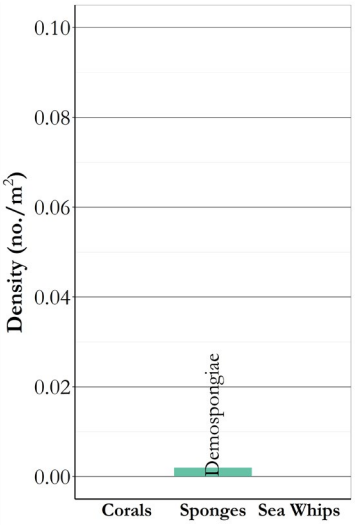
Summary - description of transect

Transect 8: Primary and secondary substrates consisted of sand and mud. The camera spent almost 85% of its time off bottom with no visual input. Six crabs and 2 eelpouts comprised 100% of the fish and crab density (0.02 individuals/m^2). One Demospongiae was identified, but not measured. No corals were identified.

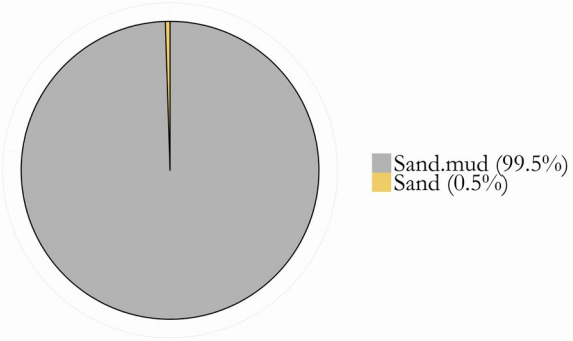
Area: Outer Shelf					Transect 9
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/12/14	55.72	-168.66	596	140	4.2

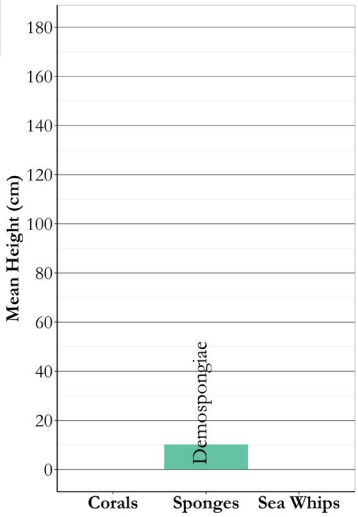
Fish and Crab Composition (n = 28)





Substrate Composition





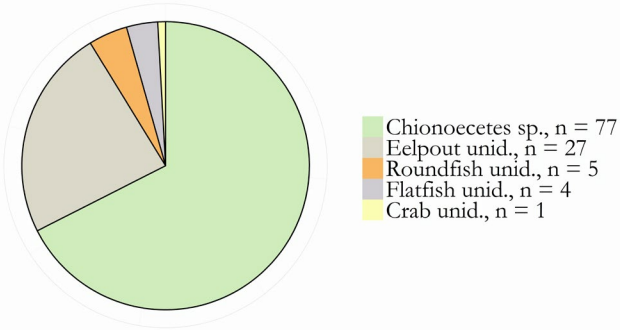
Images

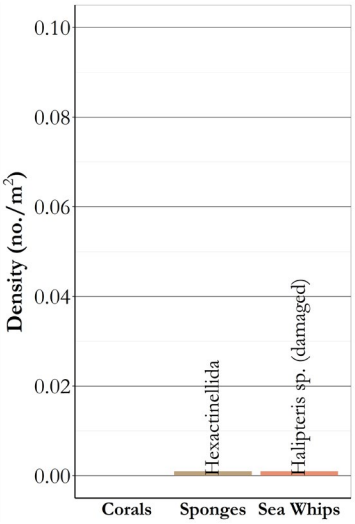
Summary - description of transect

Transect 9: Primary and secondary substrates consisted of sand and mud for (99%). Crabs (*Chionoecetes* sp.) were the most abundant taxon seen and made up 86% of all species identified. Species density was 0.05 individuals/m^2. One Demospongiae was identified and measured (10.2 cm). No corals were found.

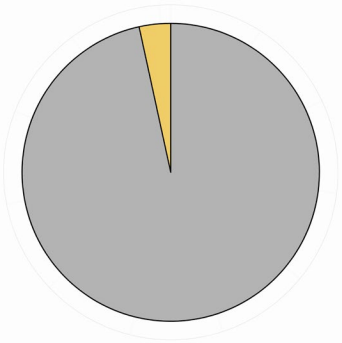
Area: Outer Shelf					Transect 10
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/12/14	55.72	-168.70	851	142	4.2

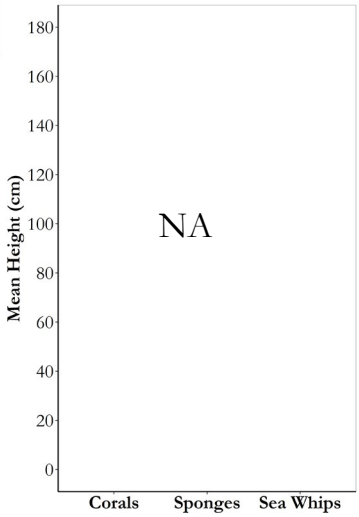
Fish and Crab Composition (n = 114)





Substrate Composition





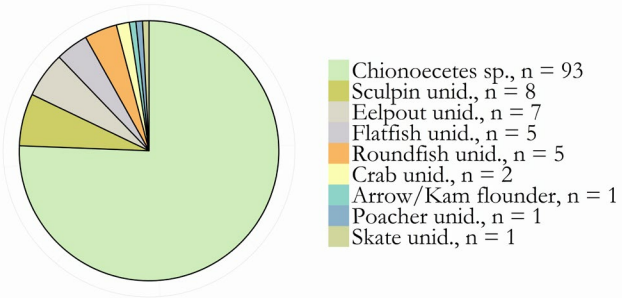
Images

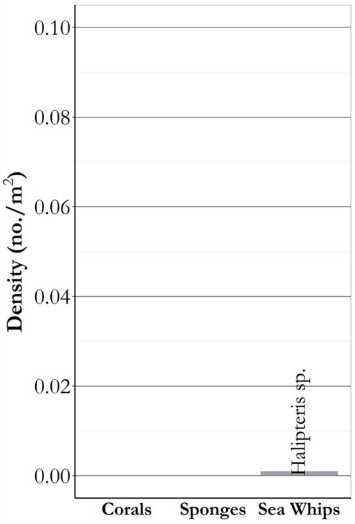
Summary - description of transect

Transect 10: Primary and secondary substrates consisted of sand and mud 97% of the transect, and just sand for the remainder. Crabs and eelpouts were 92% of the species identified. Species density was 0.13 individuals/m^2. One damaged *Halipteris* sp. and one Hexactinellida were counted. No corals or Demospongiae were identified.

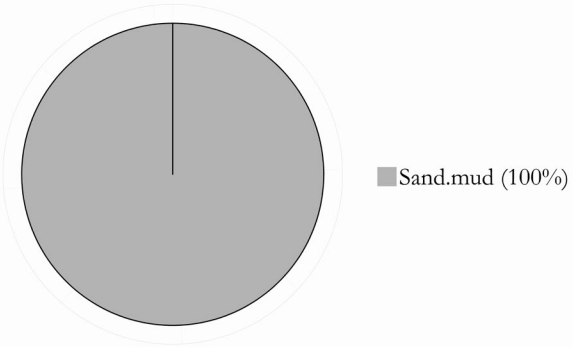
Area: Outer Shelf					Transect 12
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/12/14	55.77	-168.71	1,592	141	4.2

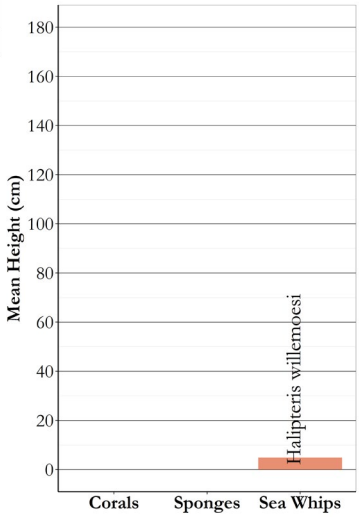
Fish and Crab Composition (n = 123)





Substrate Composition





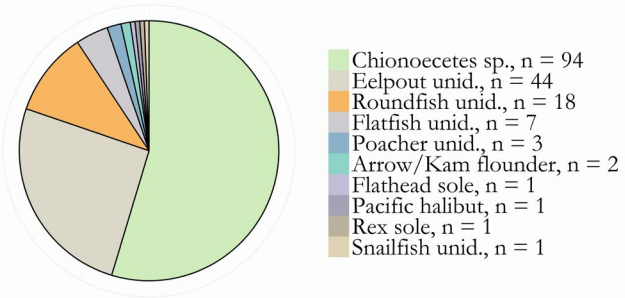
Images

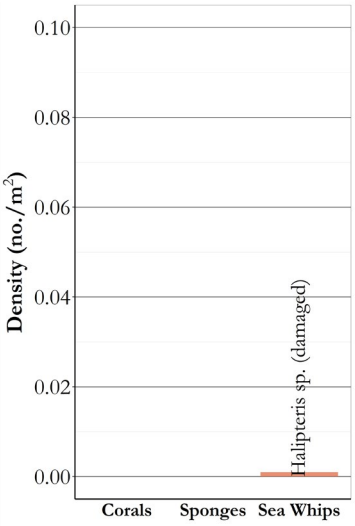
Summary - description of transect

Transect 12: Primary and secondary substrates consisted of sand and mud. Of the 123 individuals identified, 78% were crabs. Eelpouts, flatfishes, and unidentified roundfishes accounted for another 14% of the observations. Species density was 0.08 individuals/m^2. One small sea whip was counted and measured (4.8 cm). No other corals or sponges were found.

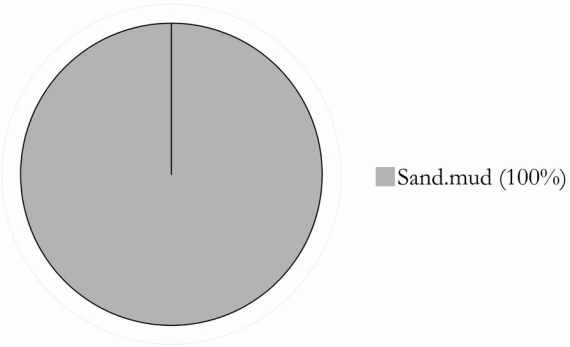
Area: Outer Shelf					Transect 13
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/12/14	55.78	-168.64	1,589	140	4.3

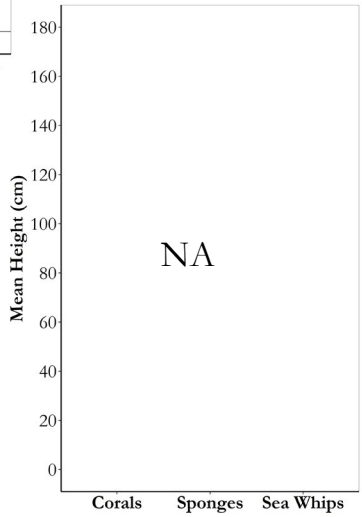
Fish and Crab Composition (n = 172)





Substrate Composition





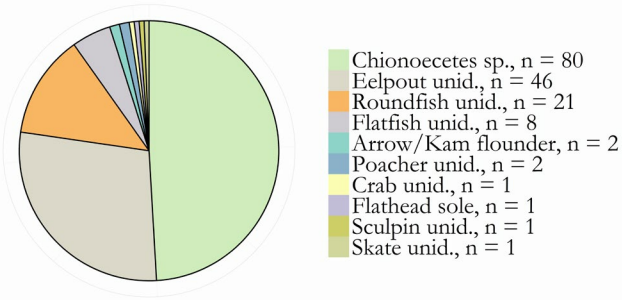
Images

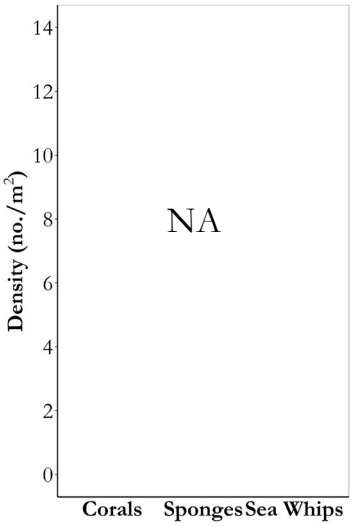
Summary - description of transect

Transect 13: Primary and secondary substrates consisted entirely of sand and mud. Of the 172 individuals identified for Transect 13, 55% were crabs. Eelpouts, flatfishes, and unidentified roundfishes accounted for another 40% of the observations. Species density was 0.11 individuals/m^2. One damaged *Halipteris* sp. was counted. No other corals or sponges were identified.

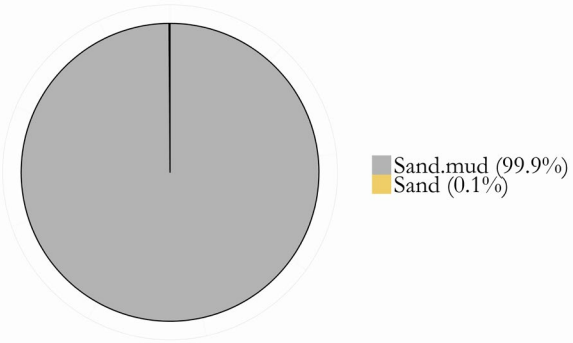
Area: Outer Shelf					Transect 17
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/13/14	55.84	-168.69	1,230	143	4.2

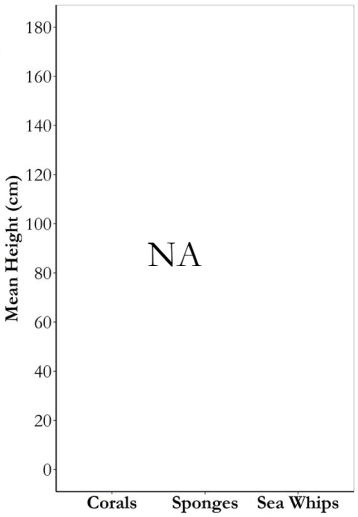
Fish and Crab Composition (n = 163)





Substrate Composition





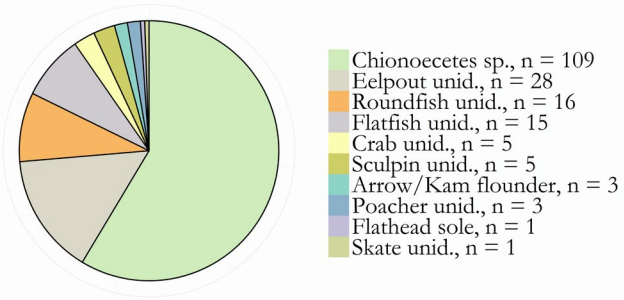
Images

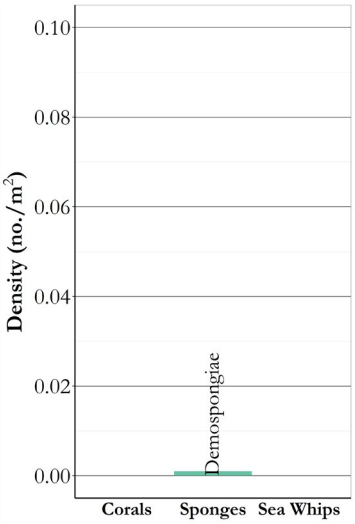
Summary - description of transect

Transect 17: Primary and secondary substrates consisted almost entirely of sand and mud. Of the 163 individuals identified, 50% were crabs, and almost 30% were eelpouts. One skate was identified. Total species density was 0.13 individuals/m^2. No vertical habitat was identified.

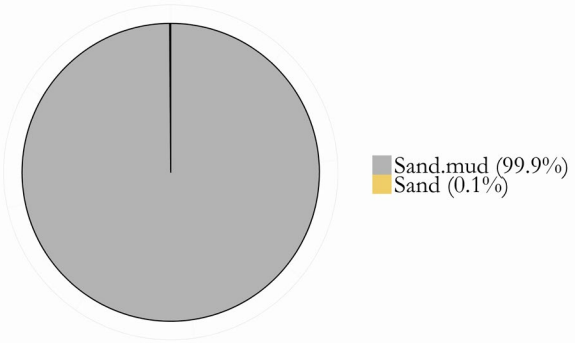
Area: Outer Shelf					Transect 18
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/13/14	55.86	-168.68	1,237	145	4.2

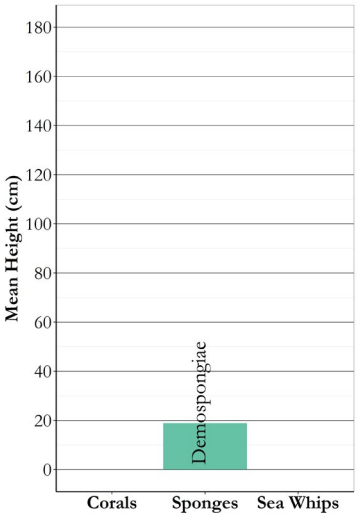
Fish and Crab Composition (n = 186)



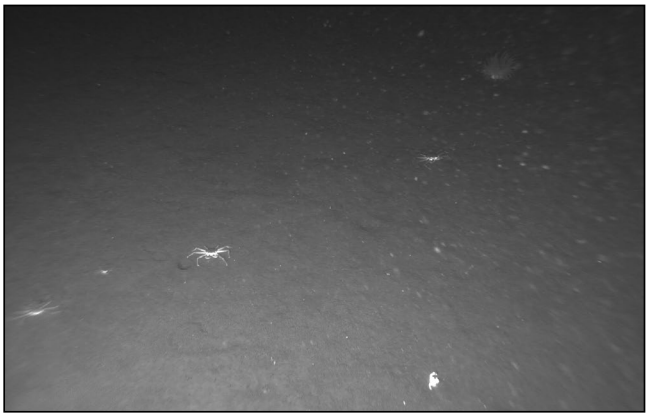


Substrate Composition





Images

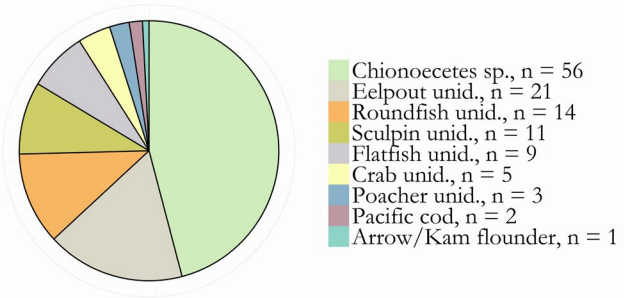


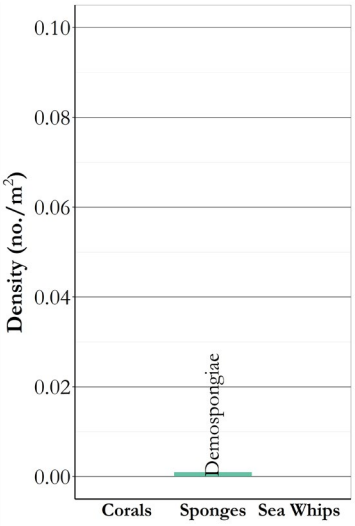
Summary - description of transect

Transect 18: Primary and secondary substrates consisted almost entirely of sand and mud. Of the 186 individuals identified, 62% were crabs, and 35% were eelpouts, flatfishes, and unidentified roundfishes. One skate was identified. Total species density was 0.15 individuals/m^2. One Demospongiae was counted and measured (18.9 cm). No corals were identified.

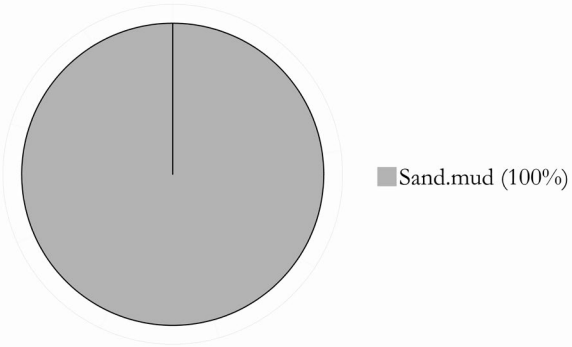
Area: Outer Shelf					Transect 19
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/13/14	55.89	-168.70	1,185	150	4.2

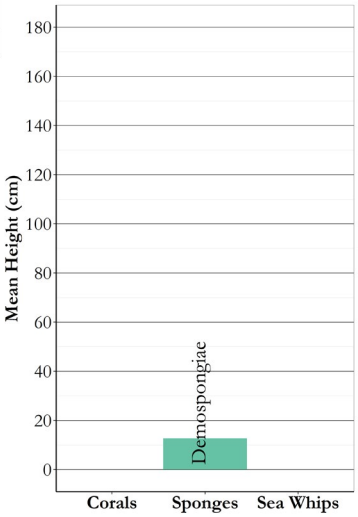
Fish and Crab Composition (n = 122)





Substrate Composition





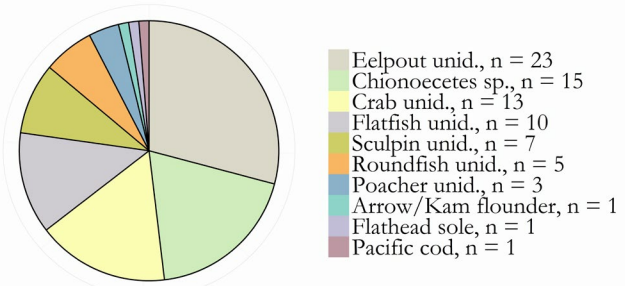
Images

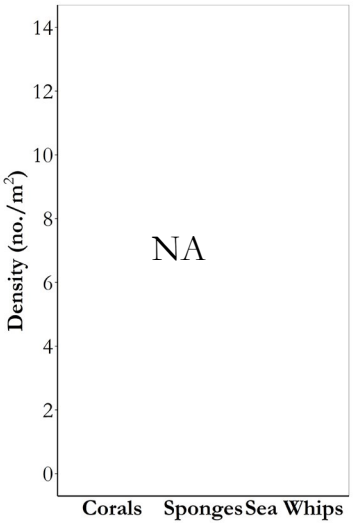
Summary - description of transect

Transect 19: Primary and secondary substrates consisted entirely of sand and mud. Of the 122 individuals identified, 50% were crabs, and 36% were eelpouts, sculpins, and unidentified roundfishes. Total species density was 0.10 individuals/m^2. One Demospongiae was counted and measured (12.7 cm). No other vertical habitat was identified.

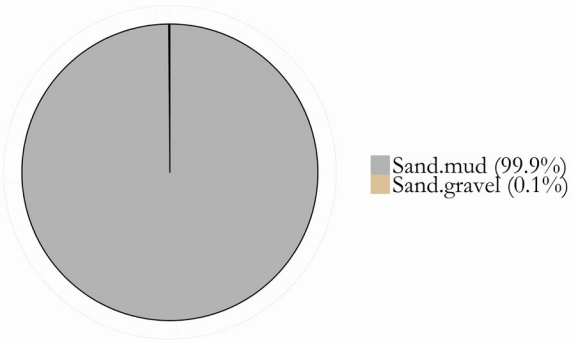
Area: Outer Shelf					Transect 20
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/13/14	55.86	-168.77	1,315	146	4.2

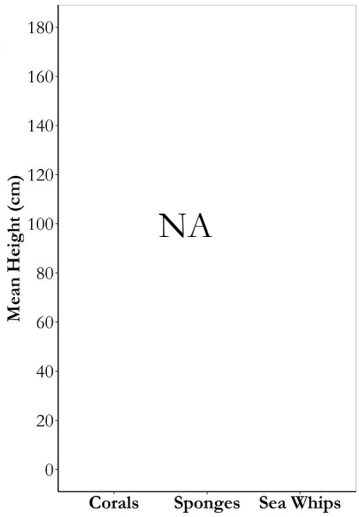
Fish and Crab Composition (n = 79)





Substrate Composition





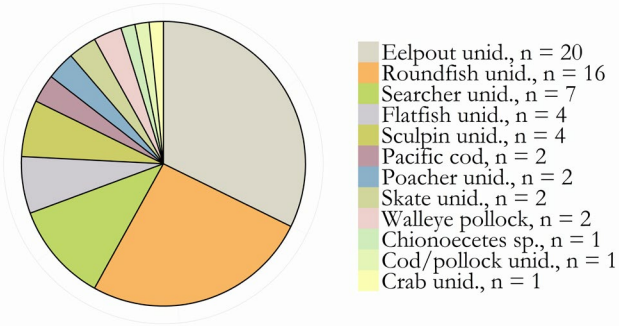
Images

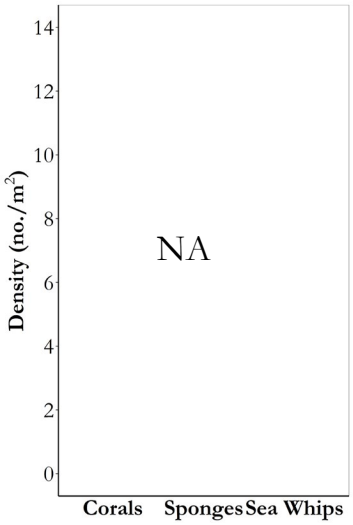
Summary - description of transect

Transect 20: Primary and secondary substrates consisted mostly of sand and mud. Crabs were the dominant taxa. Eelpouts and flatfishes accounted for 44% of the taxa counted. Species density was 0.06 individuals/m^2. No vertical habitat was identified.

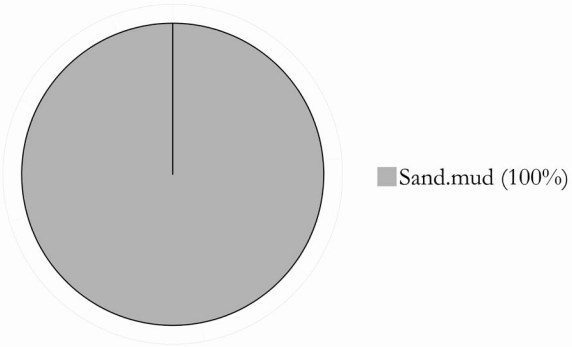
Area: Outer Shelf					Transect 22
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/13/14	55.89	-168.83	1,449	164	4.1

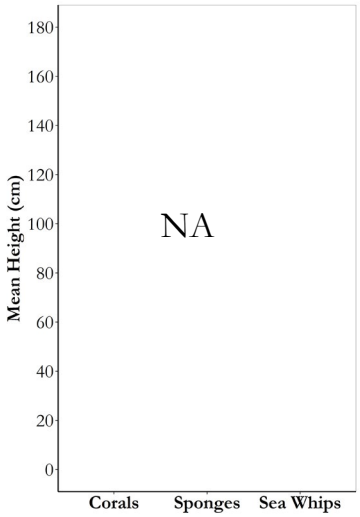
Fish and Crab Composition (n = 62)



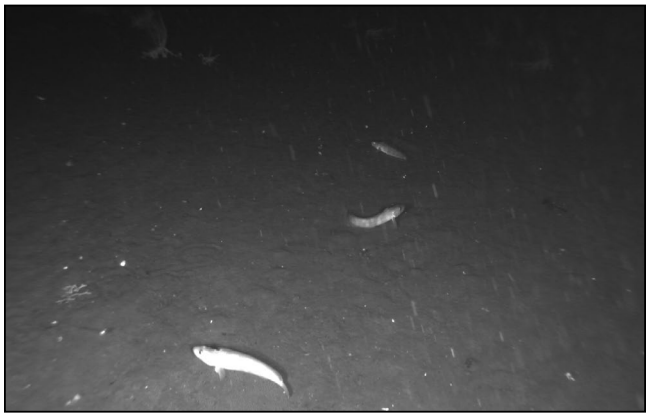


Substrate Composition





Images

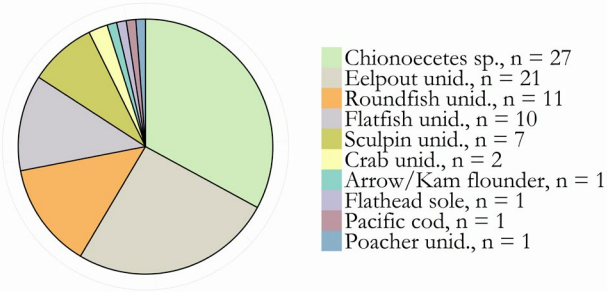


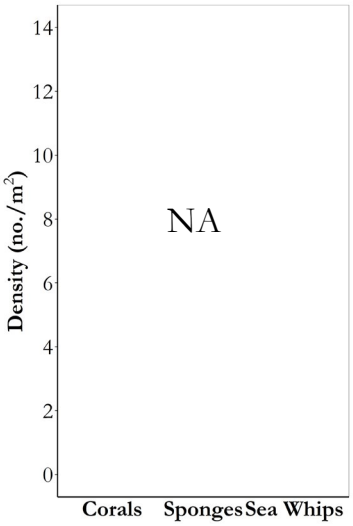
Summary - description of transect

Transect 22: Primary and secondary substrates consisted entirely of sand and mud. Eelpouts ($n = 20$) and unidentified roundfishes ($n = 16$) accounted for 58% of the 62 individuals identified. Diversity was high when compared to other transects, and included 12 taxa. Species density was 0.04 individuals/m^2. No vertical habitat was found.

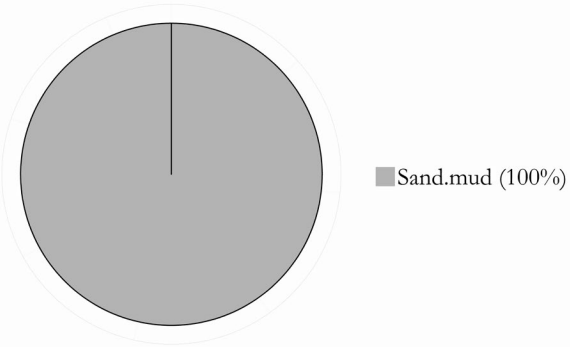
Area: Outer Shelf					Transect 23
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/13/14	55.89	-168.77	1,081	153	4.2

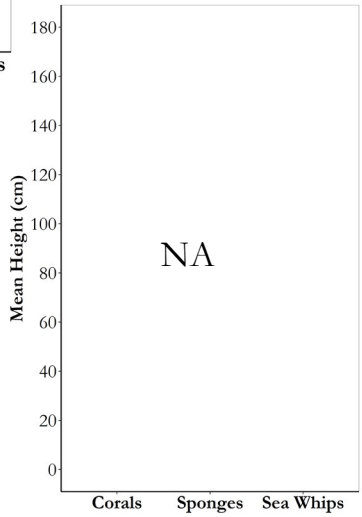
Fish and Crab Composition (n = 82)



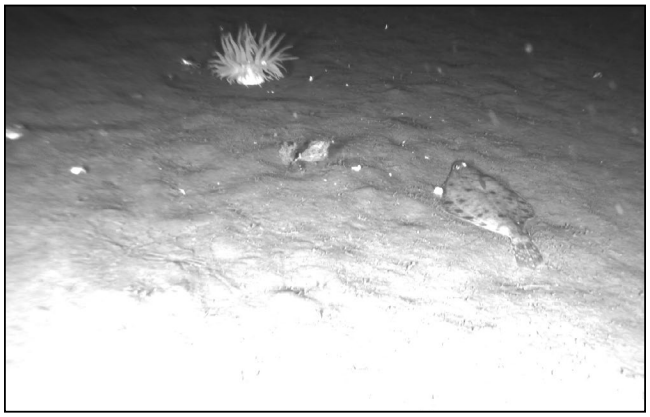


Substrate Composition





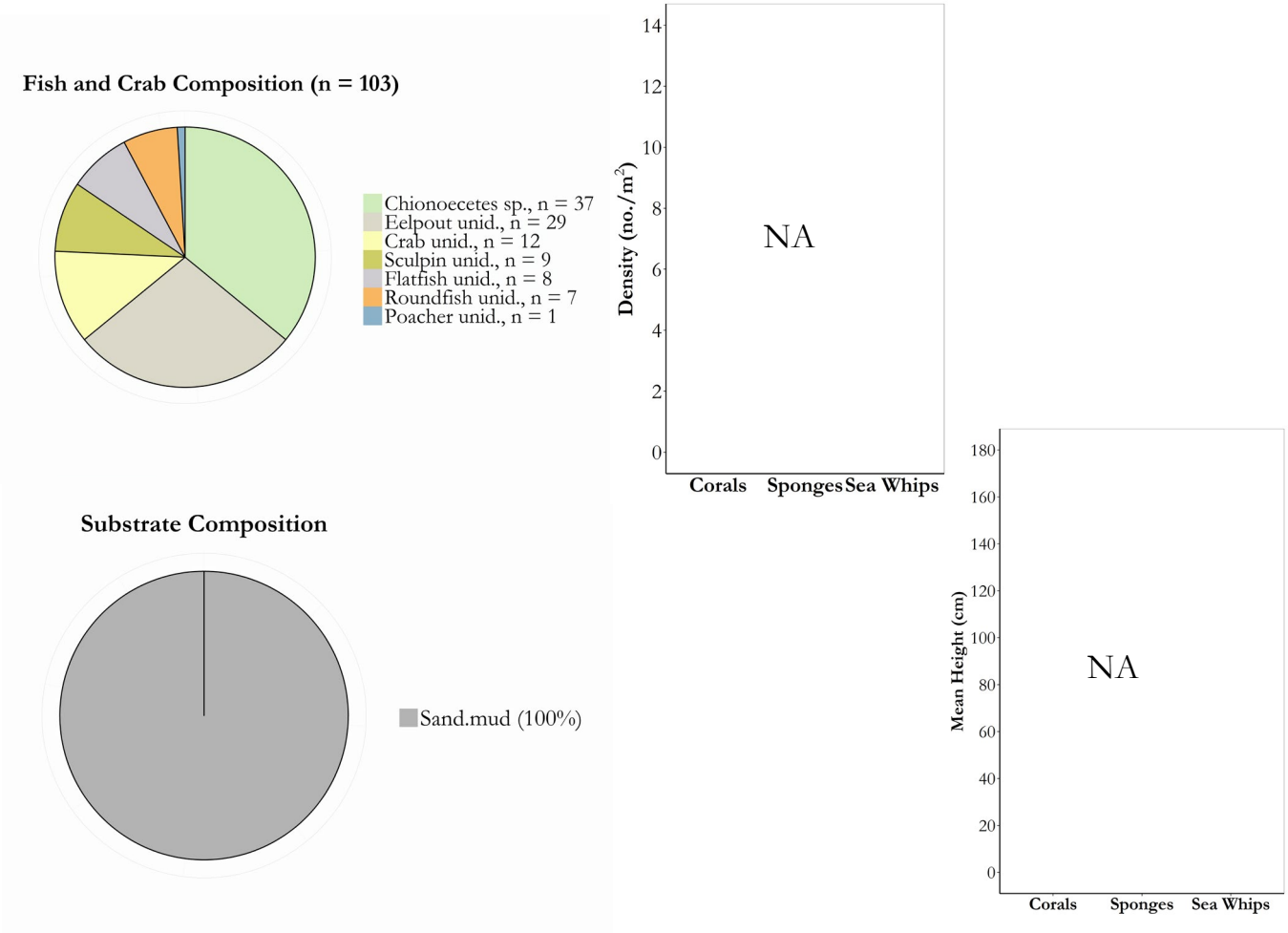
Images



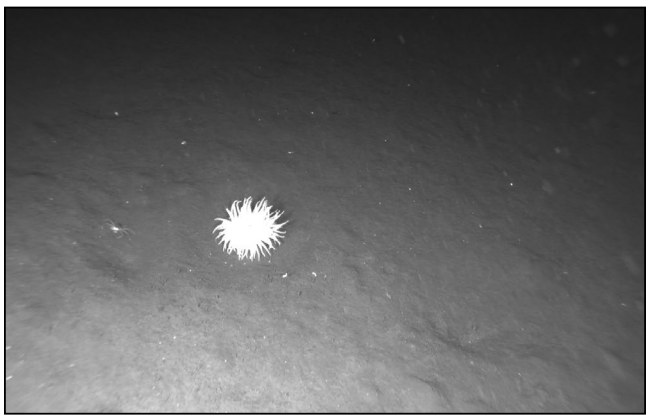
Summary - description of transect

Transect 23: Primary and secondary substrates consisted entirely of sand and mud. The camera spent approximately 15% of its time off bottom with no visual input. Species density was 0.08 individuals/m^2. Crabs made up 35% of the individuals identified. Eelpouts, flatfishes, and unidentified roundfishes composed 53% of the 82 fishes and crabs found. No vertical habitat was identified.

Area: Outer Shelf					Transect 25
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/13/14	55.88	-168.80	1,511	152	4.1



Images

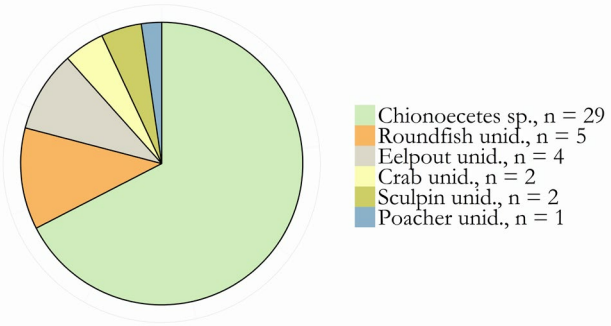


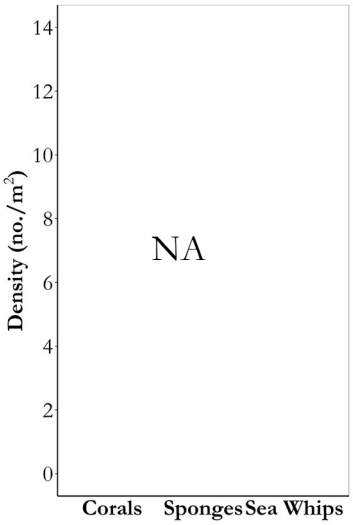
Summary - description of transect

Transect 25: Primary and secondary substrates consisted entirely of sand and mud. Of the 103 individuals identified, 48% were crabs. Eelpouts accounted for another 28% of the observations. Species density was 0.07 individuals/m^2. No vertical habitat was identified.

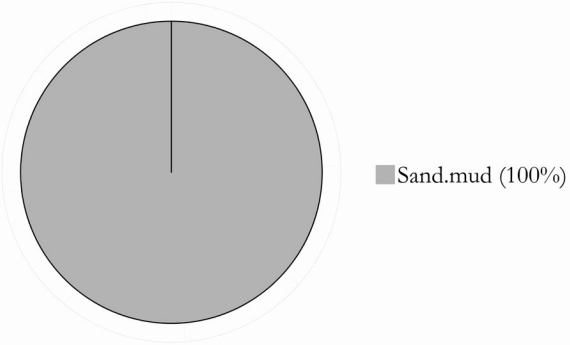
Area: Outer Shelf					Transect 32
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/14/14	56.02	-168.06	1,205	139	4 3

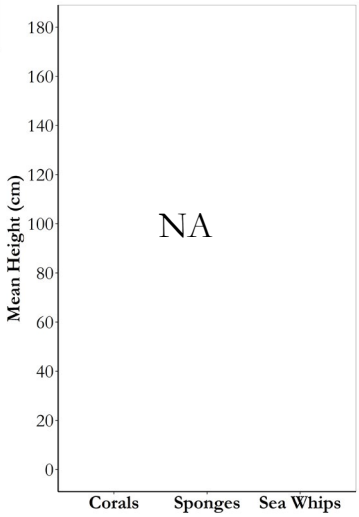
Fish and Crab Composition (n = 43)



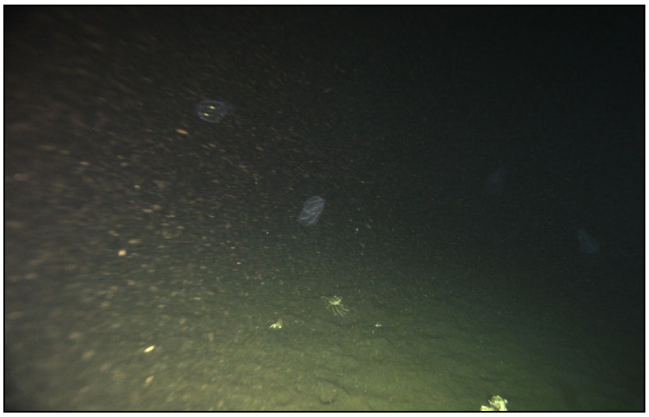


Substrate Composition





Images

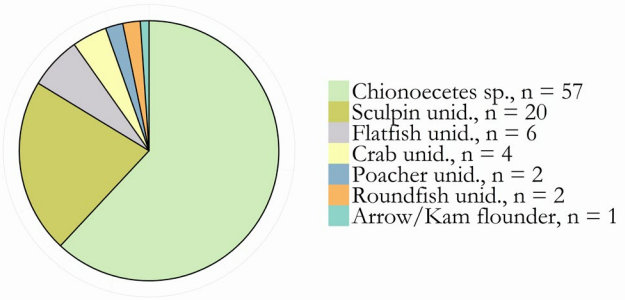


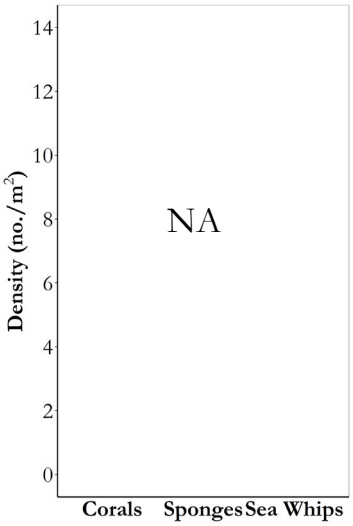
Summary - description of transect

Transect 32: Primary and secondary substrates were composed entirely of sand and mud. Of the 43 individuals counted, 72% were crabs and another 12% were unidentified roundfishes. Species density was 0.04 individuals/m^2. No vertical habitat was identified.

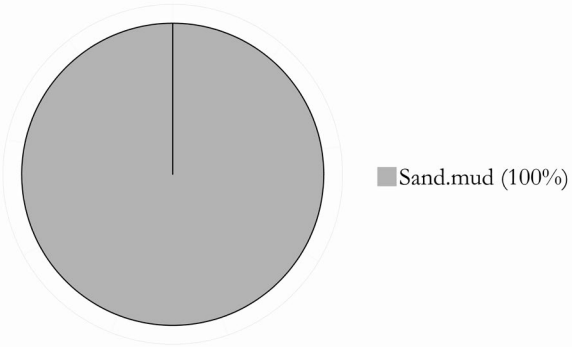
Area: Outer Shelf					Transect 33
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/14/14	56.11	-168.20	1,309	149	4 3

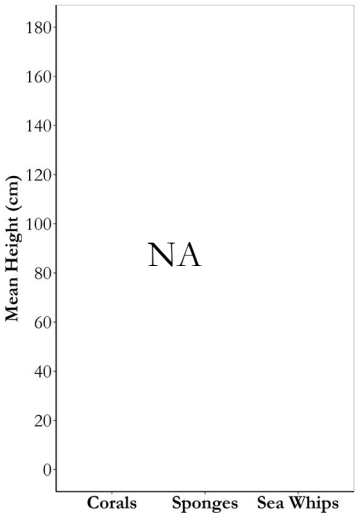
Fish and Crab Composition (n = 92)





Substrate Composition





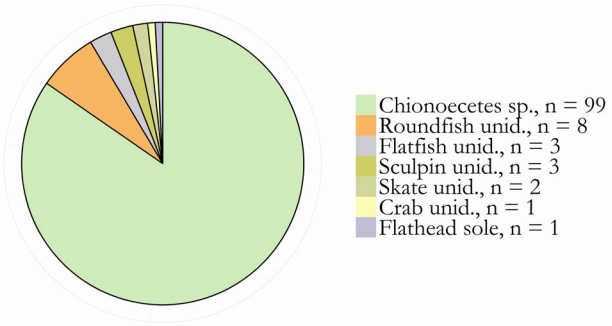
Images

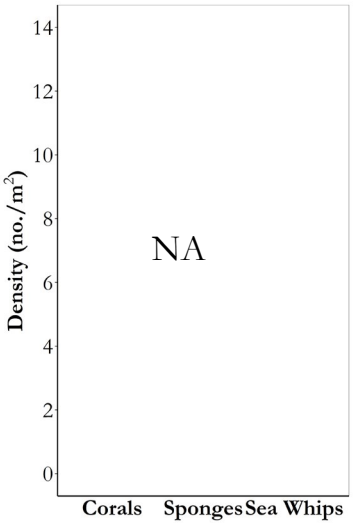
Summary - description of transect

Transect 33: Primary and secondary substrates were composed entirely of sand and mud. Ninety-two individuals were counted. Crabs and sculpins were 88% of the observations. Species density was 0.07 individuals/m^2. No vertical habitat was identified.

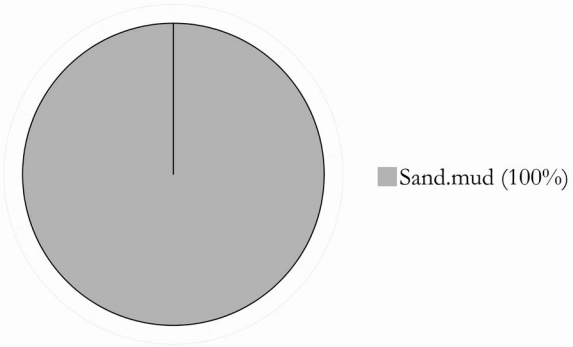
Area: Outer Shelf					Transect 34
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/14/14	56.15	-168.12	2,179	143	4 3

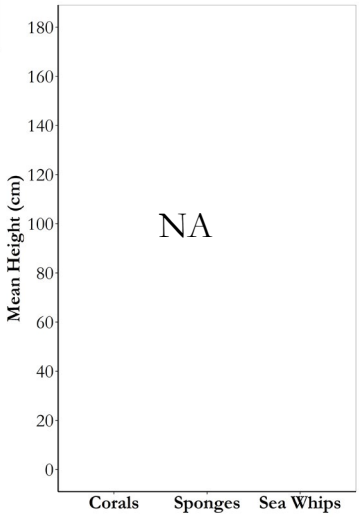
Fish and Crab Composition (n = 117)



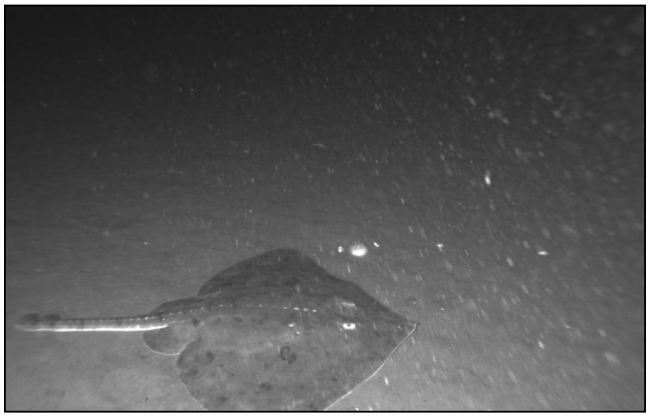


Substrate Composition





Images

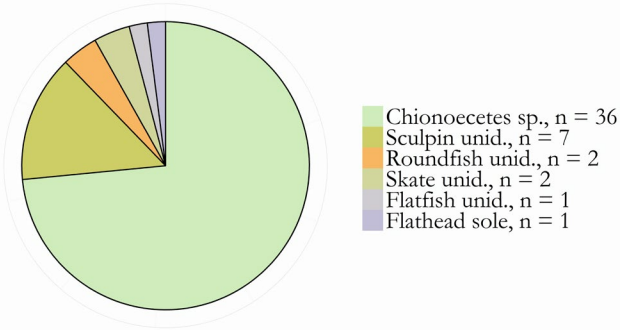


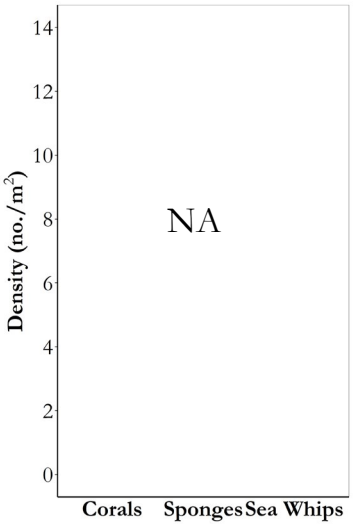
Summary - description of transect

Transect 34: Primary and secondary substrates were composed entirely of sand and mud. Species density was 0.05 individuals/m^2, and was comprised largely of crabs. All other species were found in frequencies less than 10, including 2 skates. No vertical habitat was identified.

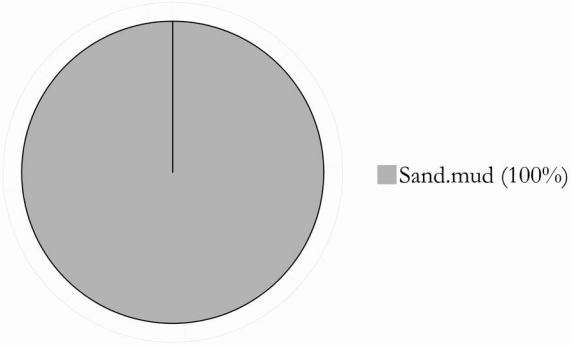
Area: Outer Shelf					Transect 35
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/14/14	56.14	-168.18	800	147	4 3

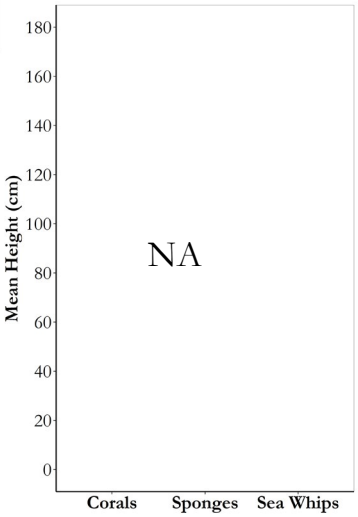
Fish and Crab Composition (n = 49)





Substrate Composition





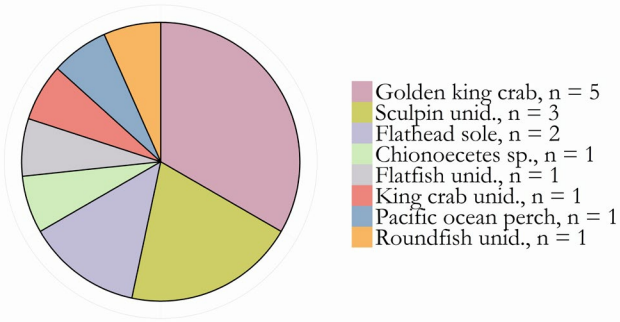
Images

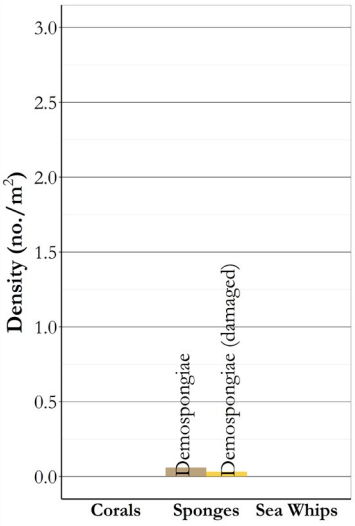
Summary - description of transect

Transect 35: Primary and secondary substrates were composed entirely of sand and mud. Species density was 0.06 individuals/m^2, and was comprised largely of crabs. Sculpins were the second most abundant taxon identified. No vertical habitat was found.

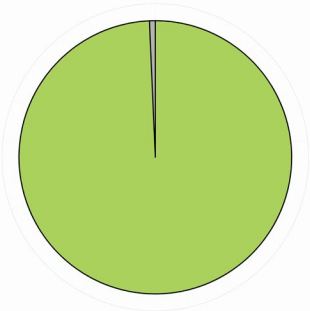
Area: Outer Shelf					Transect 37
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/14/14	56.15	-168.49	1,421	252	3 9

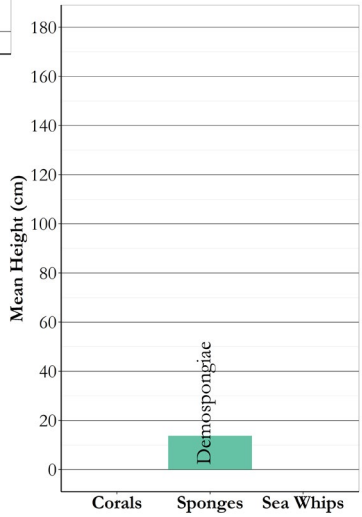
Fish and Crab Composition (n = 15)





Substrate Composition





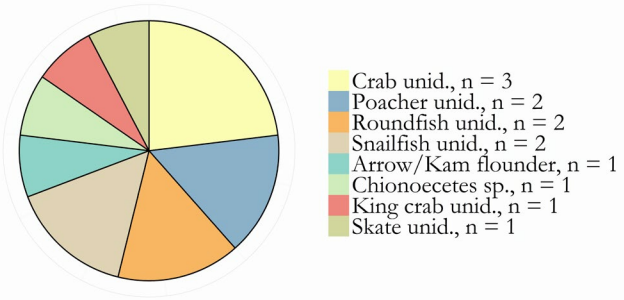
Images

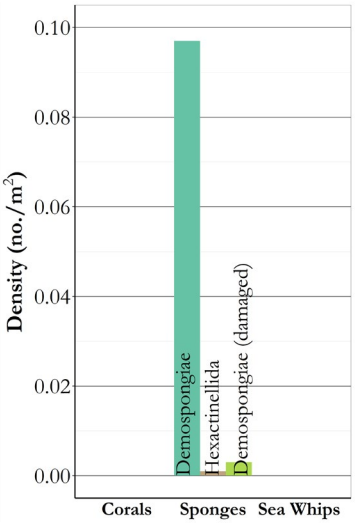
Summary - description of transect

Transect 37: Primary and secondary substrates consisted of mixed coarse (99%) and sand/mud (1%). Overall fish and crab density was 0.01 individuals/m^2, golden king crabs, sculpins, and flathead soles. *Chionoecetes* sp were the most abundant taxa. Vertical habitat density consisted of Demospongiae (0.09 individuals/m^2) with an average height of 13.7 cm.

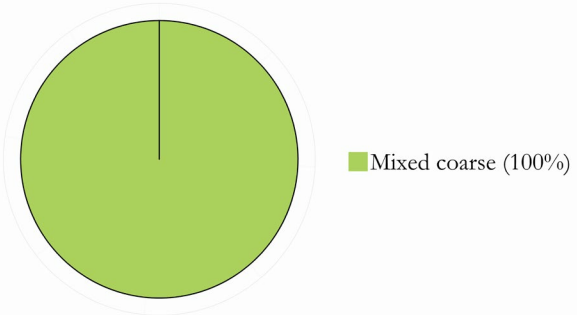
Area: Outer Shelf					Transect 38
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/14/14	56.19	-168.52	1,166	206	4 1

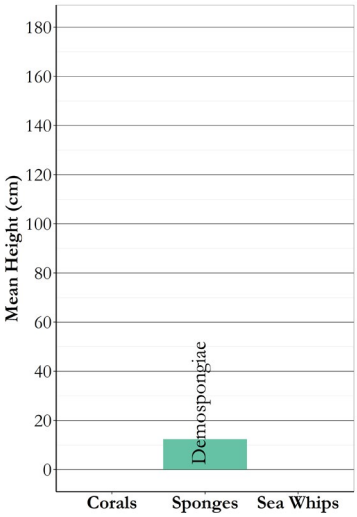
Fish and Crab Composition (n = 13)





Substrate Composition





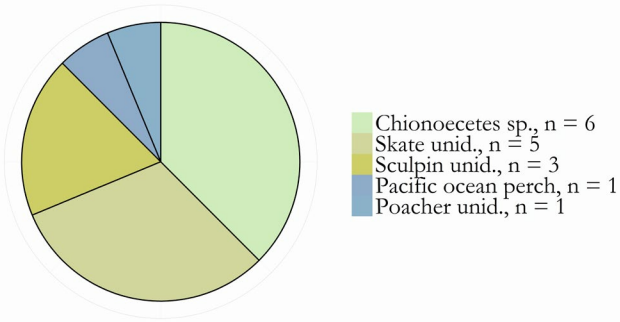
Images

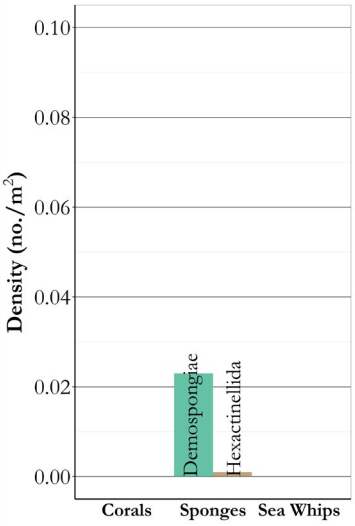
Summary - description of transect

Transect 38: Primary and secondary substrates consisted of mixed coarse sediments. Species density was 0.01 individuals/m^2, with 13 individuals identified. Skate egg cases were abundant ($n = 38$). Vertical habitat consisted of 117 Demospongiae (4 damaged) and 1 Hexactinellida. Sponge density was 0.10 individuals/m^2. Mean height for 10 measured Demospongiae was 12.3 cm.

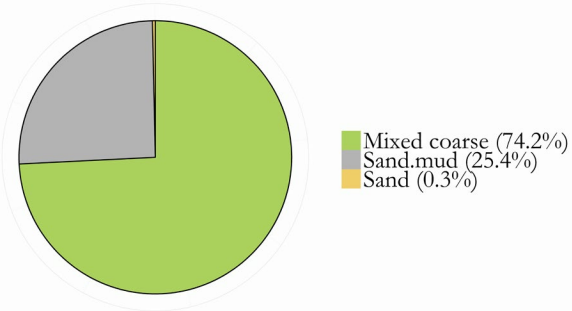
Area: Outer Shelf					Transect 39
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/14/14	56.23	-168.44	1,496	174	4 3

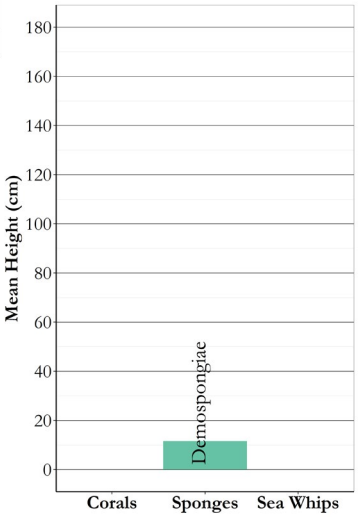
Fish and Crab Composition (n = 16)



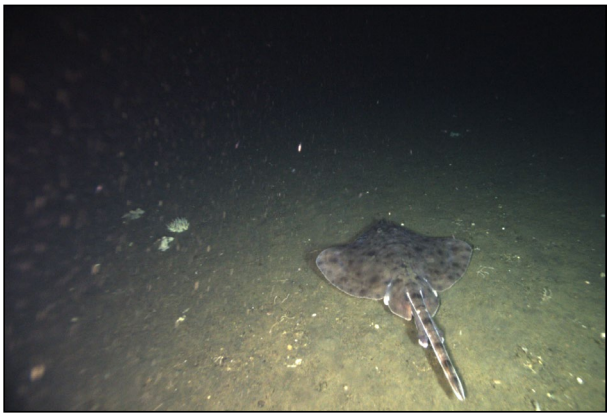


Substrate Composition





Images

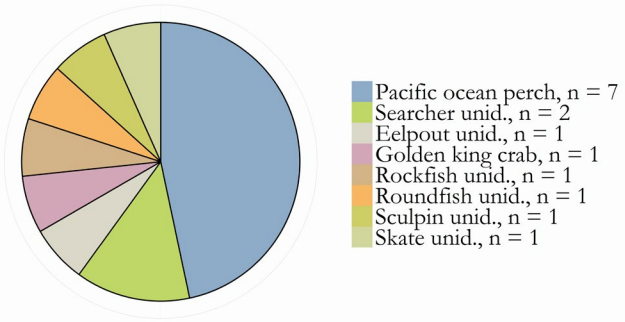


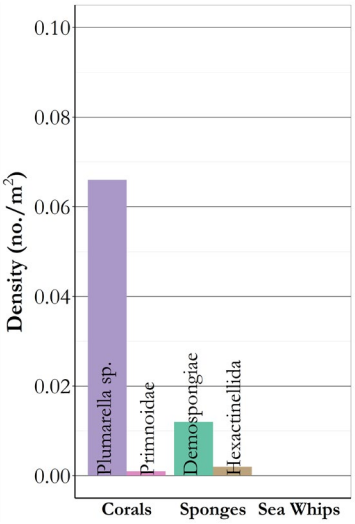
Summary - description of transect

Transect 39: Primary and secondary substrates consisted of mixed coarse for 75% of the transect and another ~24% was sand/mud. Only 16 individuals were counted, and 38% were crabs (*Chionoecetes* sp.). Another 50% of the observations were comprised of skates and sculpins. Species density was 0.01 individuals/m^2. Vertical habitat consisted of 35 Demospongiae and 2 Hexactinellida. Sponge density was 0.02 individuals/m^2. Mean height for 7 measured Demospongiae was 11.6 cm. No corals were identified.

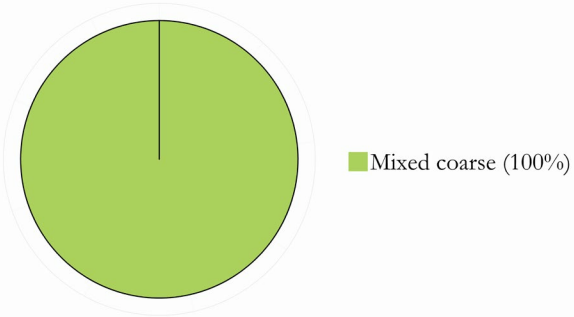
Area: Outer Shelf					Transect 40
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/14/14	56.21	-168.62	1,859	212	4 0

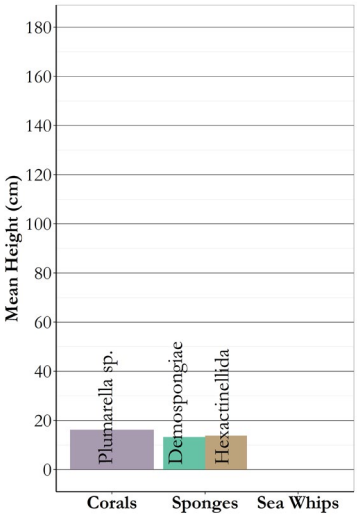
Fish and Crab Composition (n = 15)



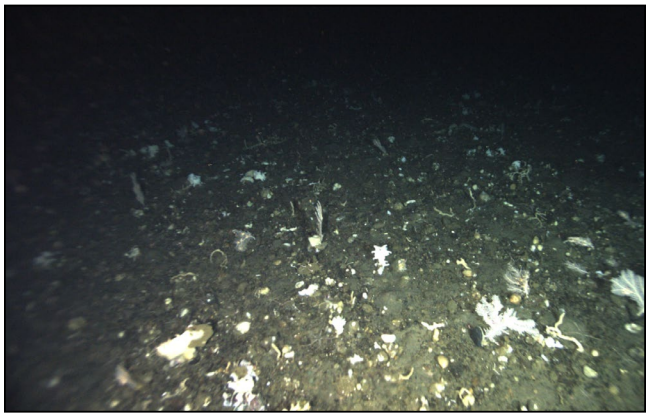


Substrate Composition





Images

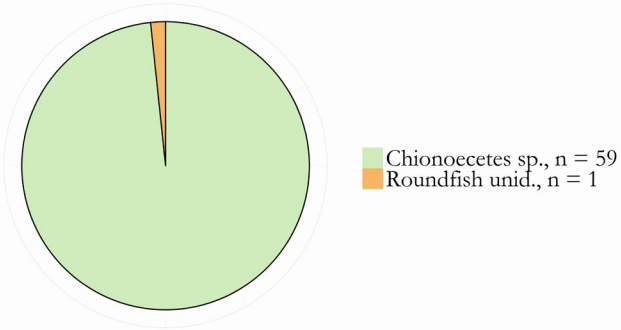


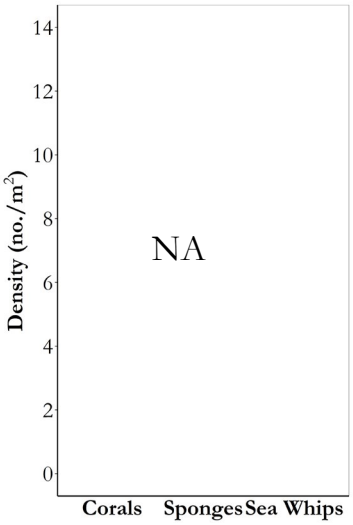
Summary - description of transect

Transect 40: Primary and secondary substrates consisted entirely of mixed coarse sediments. Only 15 individuals were counted, and 47% were Pacific ocean perch. Species density was 0.01 individuals/m^2. Vertical habitat consisted of 124 corals (*Plumarella* sp. and Primnoidae), 22 Demospongiae, and 3 Hexactinellida. Sponge and coral density was 0.08 individuals/m^2. Mean height for all measured corals and sponges was 15.7 cm. No sea whips were identified.

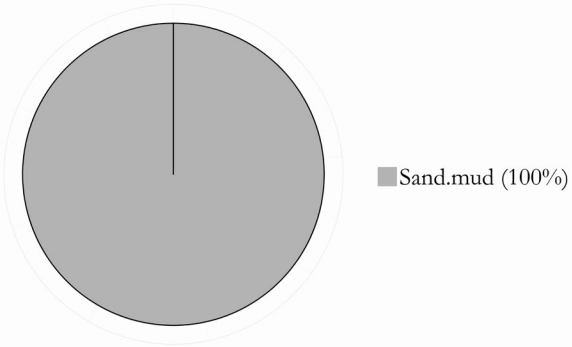
Area: Outer Shelf					Transect 44
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/15/14	56.49	-168.65	1,598	110	4 0

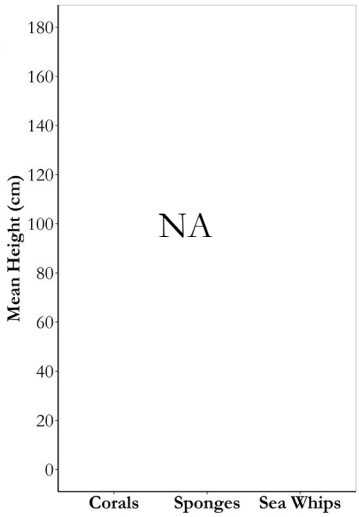
Fish and Crab Composition (n = 60)





Substrate Composition





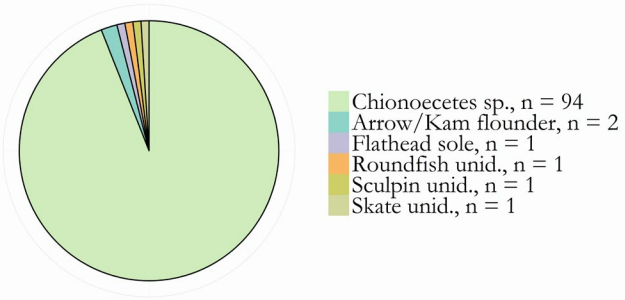
Images

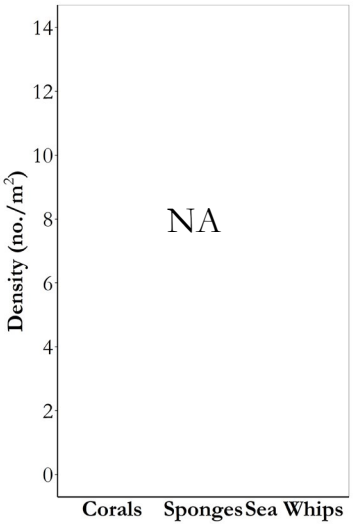
Summary - description of transect

Transect 44: Primary and secondary substrates consisted entirely of sand and mud. Sixty individuals were counted for this transect and 59 of them were crabs (*Chionoecetes* sp.). One unidentified roundfish was also seen. Crab and fish density was 0.04 individuals/m^2. No vertical habitat was identified.

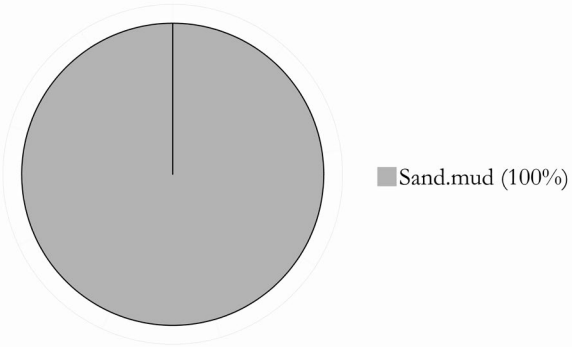
Area: Outer Shelf					Transect 45
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/15/14	56.46	-168.70	1,408	112	4 1

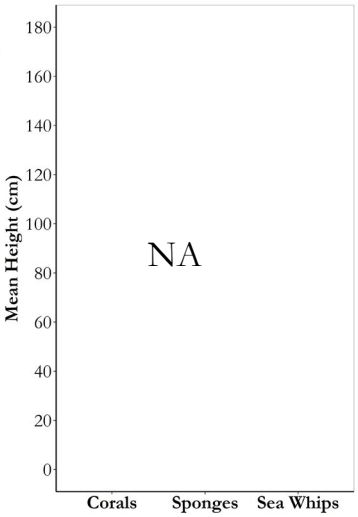
Fish and Crab Composition (n = 100)





Substrate Composition



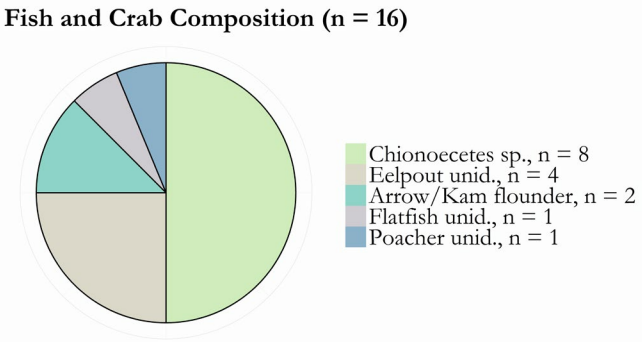


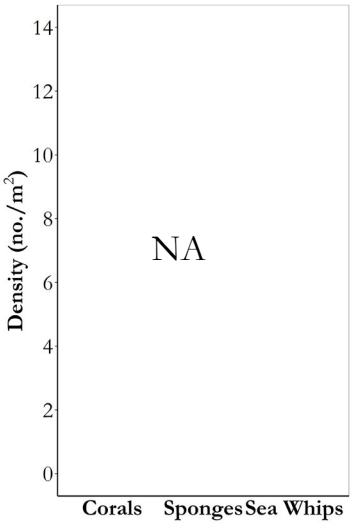
Images

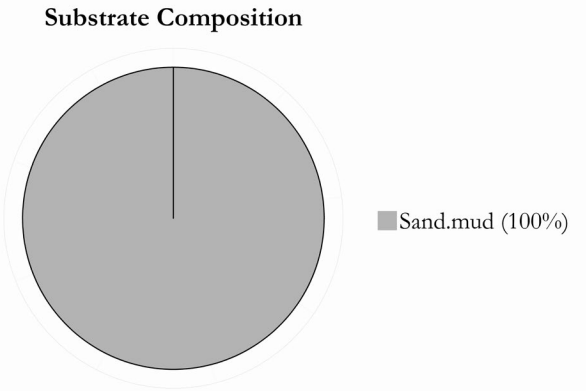
Summary - description of transect

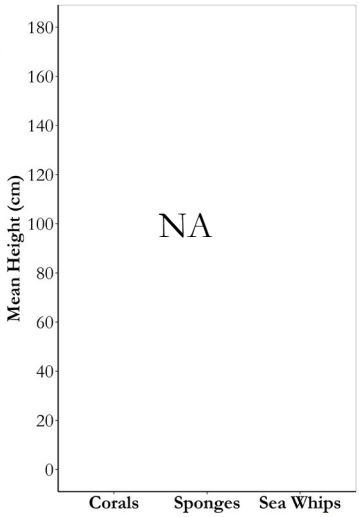
Transect 45: Primary and secondary substrates consisted entirely of sand and mud. Species composition was dominated by crabs. Crab and fish density was 0.07 individuals/m^2. No vertical habitat was identified.

Area: Outer Shelf					Transect 46
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/15/14	56.31	-169.03	1,477	136	4 4

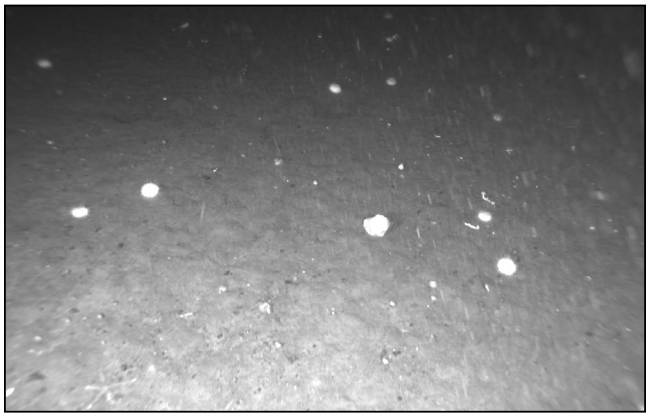








Images

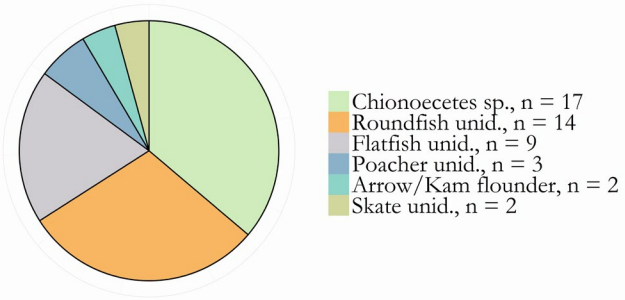


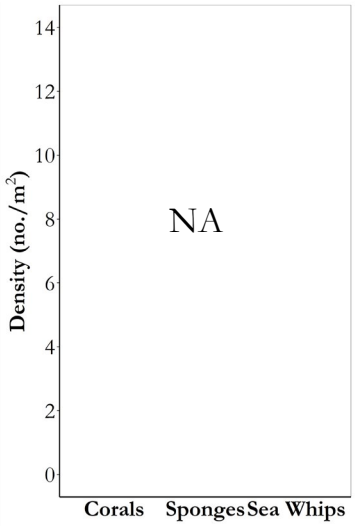
Summary - description of transect

Transect 46: Primary and secondary substrates consisted entirely of sand and mud. Only 16 individuals were counted in this transect, and 50% of them were crabs (*Chionoecetes* sp.). Eelpouts accounted for another 25% of the observations. Crab and fish density was 0.01 individuals/m^2. No vertical habitat was identified.

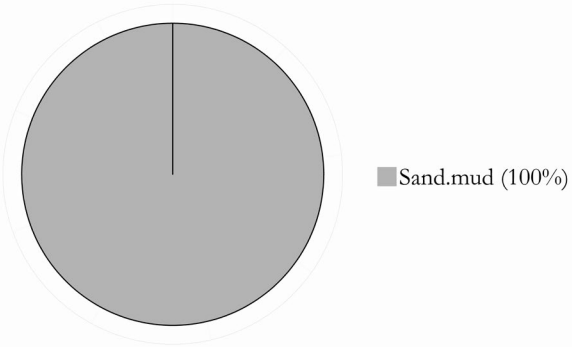
Area: Outer Shelf					Transect 47
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/15/14	56.27	-169.09	1,353	141	4 3

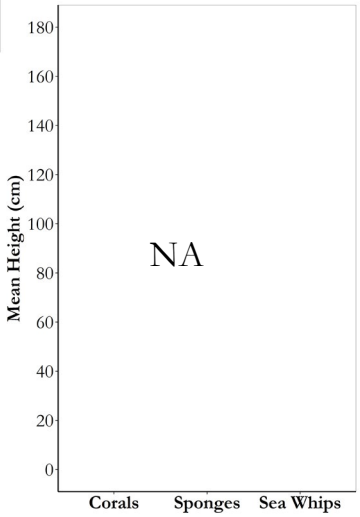
Fish and Crab Composition (n = 47)





Substrate Composition



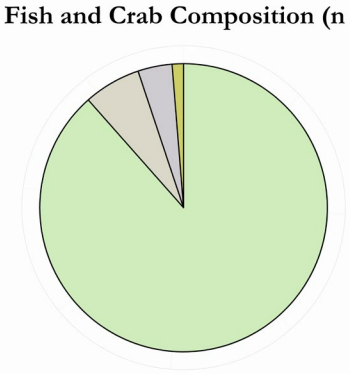


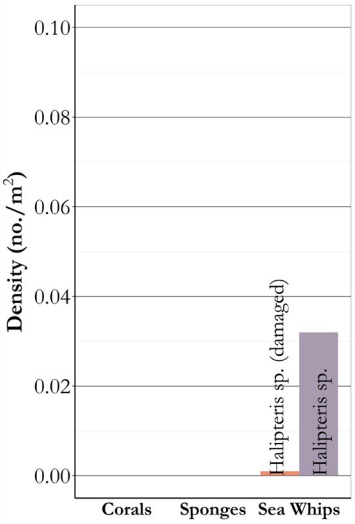
Images

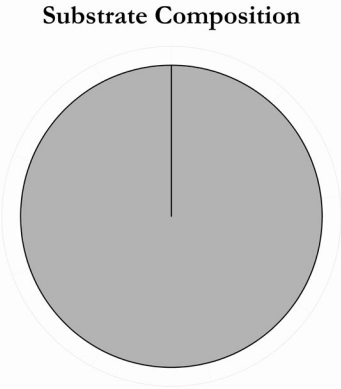
Summary - description of transect

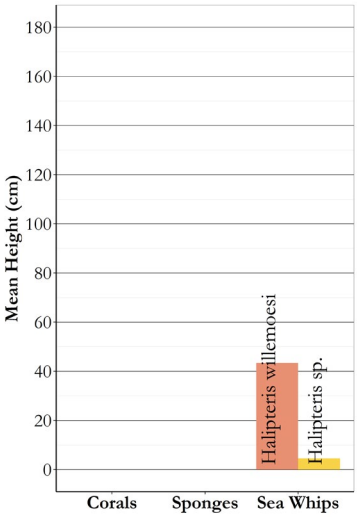
Transect 47: Primary and secondary substrates consisted entirely of sand and mud. Of the 47 individuals identified, 36% of them were crabs (*Chionoecetes* sp.). Unidentified roundfishes accounted for another 30% of the observations. Crab and fish density was 0.03 individuals/m^2. No vertical habitat was identified.

Area: Outer Shelf					Transect 56
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/16/14	56.44	-169.81	711	91	4 4

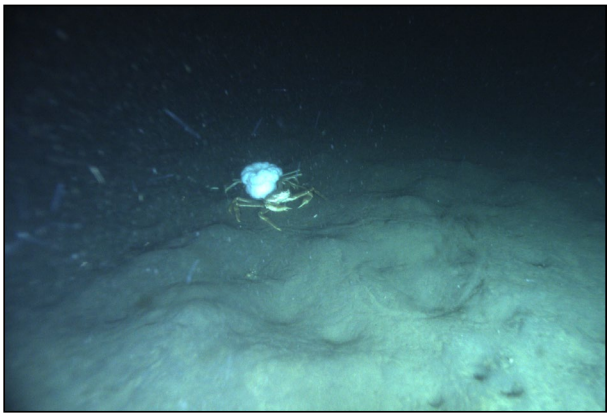


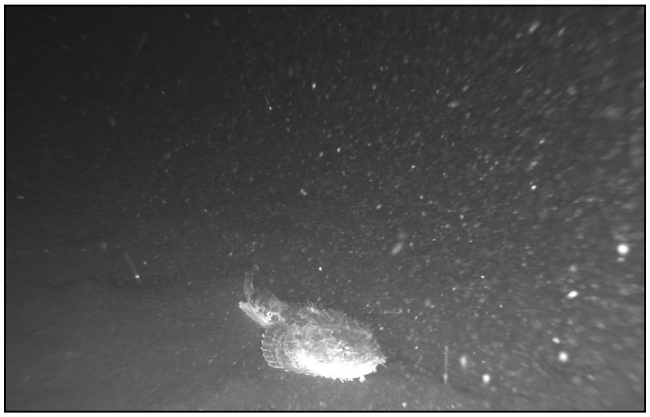






Images



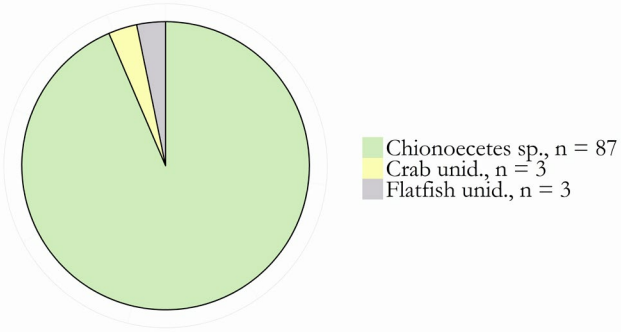


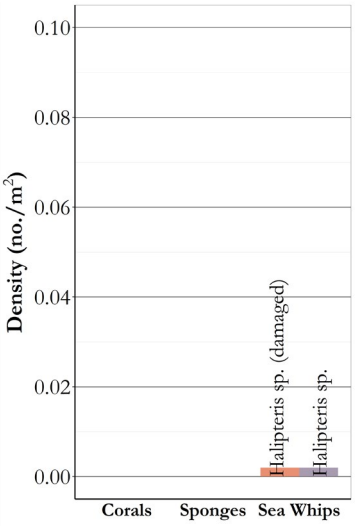
Summary - description of transect

Transect 56: Primary and secondary substrates consisted of sand and mud. Overall fish and crab density was 0.11 individuals/m^2. *Chionoecetes* sp. dominated the species composition accounting for 88% of the enumerated taxa. Vertical habitat consisted of 24 sea whips (1 damaged), with a density of 0.03 individuals/m^2. *Halipteris willemoesi* heights ($n = 12$) ranged from 2.7 cm to 8.7 cm, with a mean of 4.5 cm. No other corals or sponges were observed.

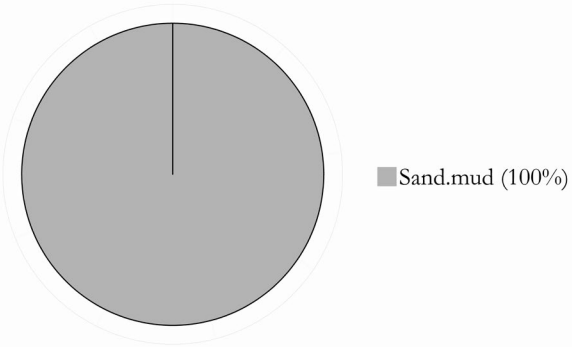
Area: Outer Shelf					Transect 57
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/16/14	56.43	-169.80	1,055	92	4 4

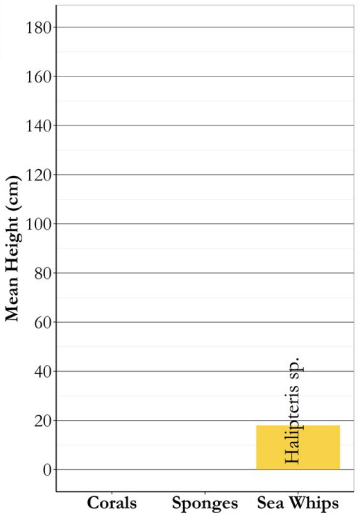
Fish and Crab Composition (n = 93)



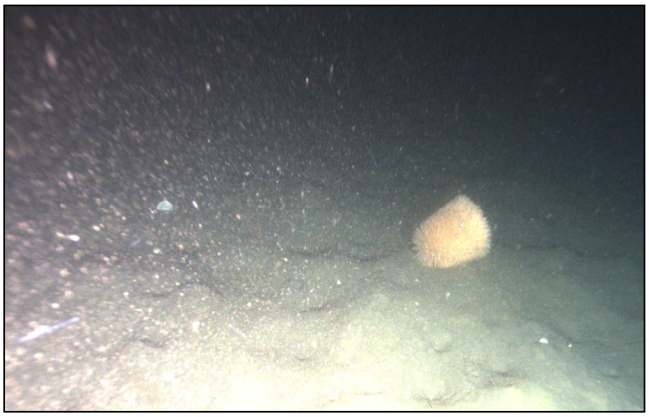


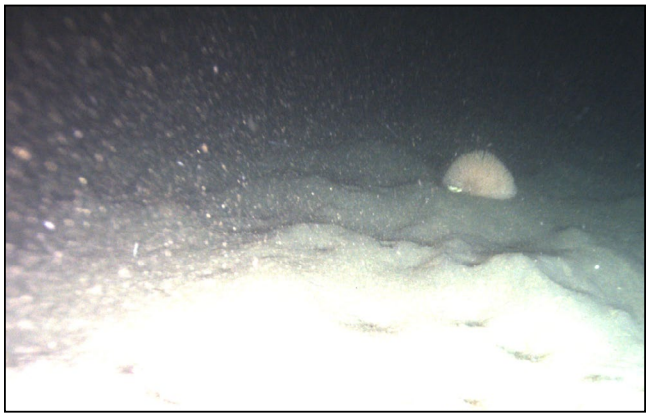
Substrate Composition





Images



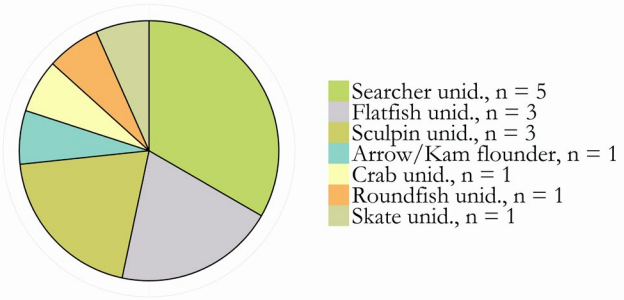


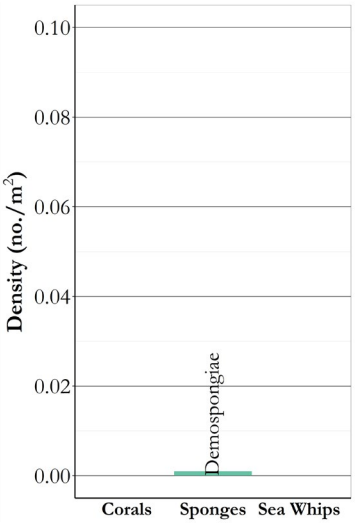
Summary - description of transect

Transect 57: Primary and secondary substrates consisted of sand and mud. Overall fish and crab density was 0.09 individuals/m^2. *Chionoecetes* sp. dominated the species composition accounting for 94% of the enumerated taxa. Vertical habitat consisted of 4 sea whips (2 damaged), with a density of < 0.01 individuals/m^2. No other corals or sponges were observed.

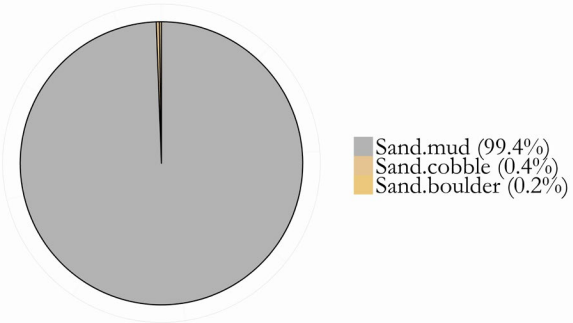
Area: Outer Shelf					Transect 64
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/16/14	56.31	-169.58	1,039	158	NA

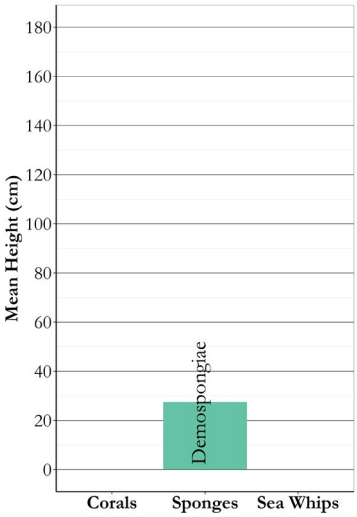
Fish and Crab Composition (n = 15)



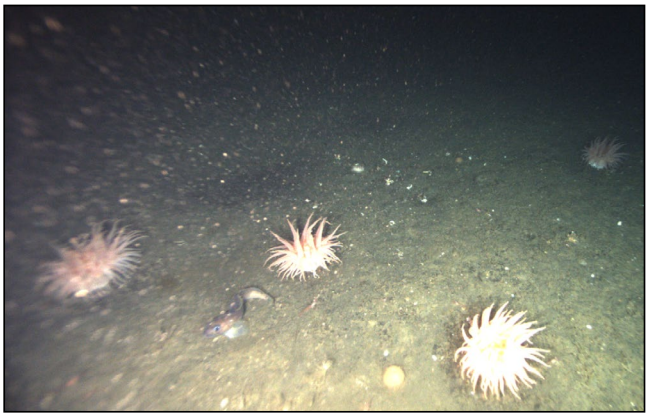


Substrate Composition





Images

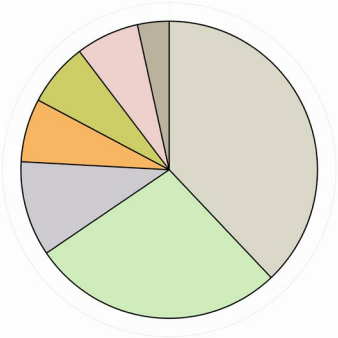


Summary - description of transect

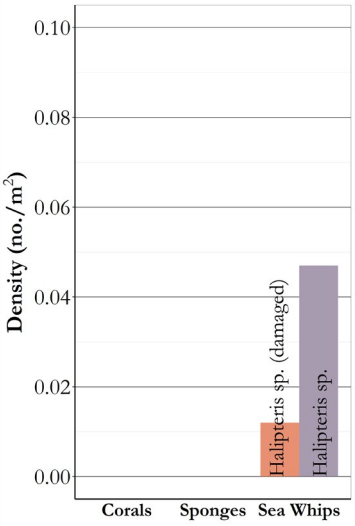
Transect 64: Primary and secondary substrates consisted almost entirely of sand and mud. Overall fish and crab density was 0.01 individuals/m^2. Searchers, sculpins, and flatfishes accounted for 73% of the enumerated taxa. Vertical habitat consisted of 1 Demospongiae. No corals were observed.

Area: Outer Shelf					Transect 79
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/18/14	56.17	-170.00	492	117	4.5

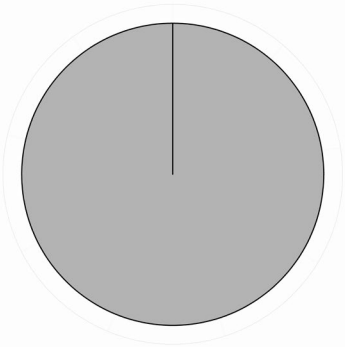
Fish and Crab Composition (n = 29)



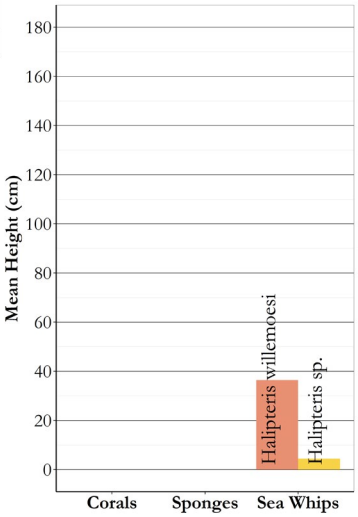
Eelpout unid., n = 11
Chionoecetes sp., n = 8
Flatfish unid., n = 3
Roundfish unid., n = 2
Sculpin unid., n = 2
Walleye pollock, n = 2
Rex sole, n = 1



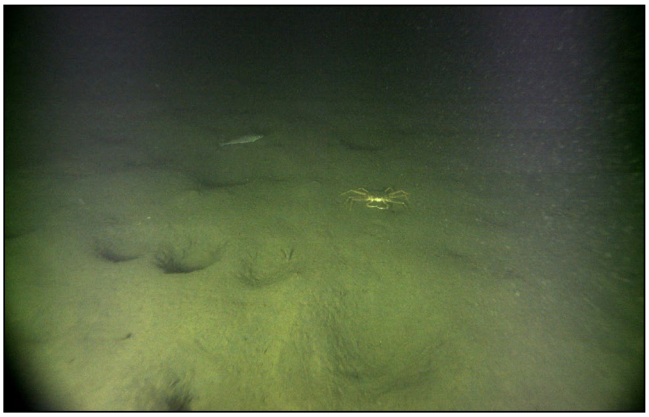
Substrate Composition

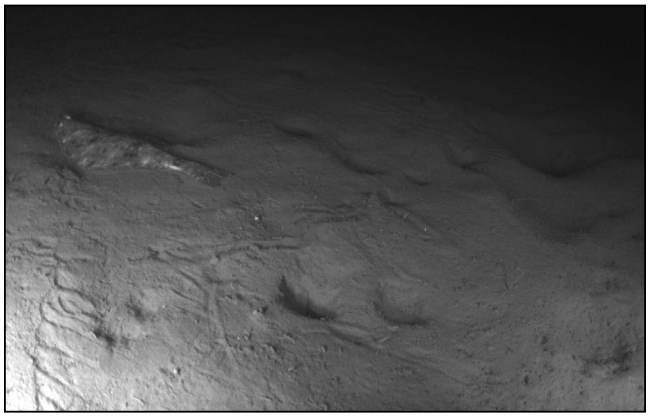


Sand.mud (100%)



Images



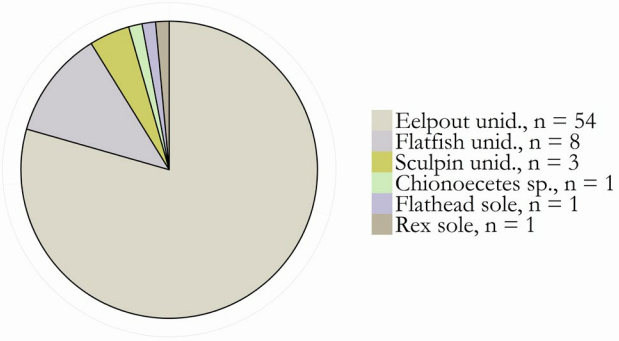


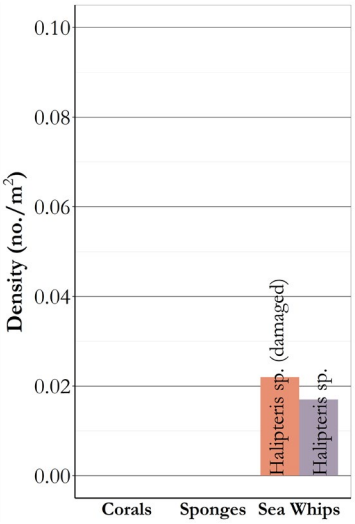
Summary - description of transect

Transect 79: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.06 individuals/m^2. Twenty-nine individuals were identified, and 38% were eelpouts. *Chionoecetes* sp was the next most abundant taxon at 28%. Vertical habitat consisted of 29 sea whips (6 damaged) with a density of 0.06 individuals/m^2. Two *Halipteris* sp and 1 *Halipteris willemoesi* were measured. No other corals or sponges were identified.

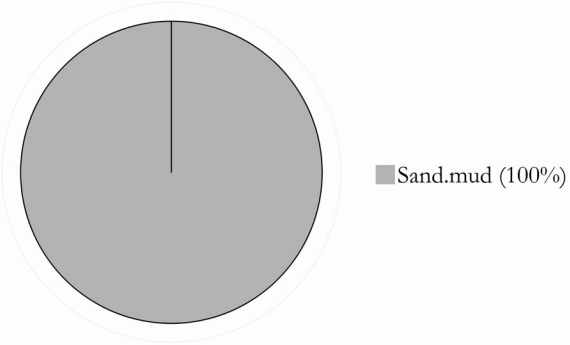
Area: Outer Shelf					Transect 80
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/18/14	56.15	-170.07	582	117	4 4

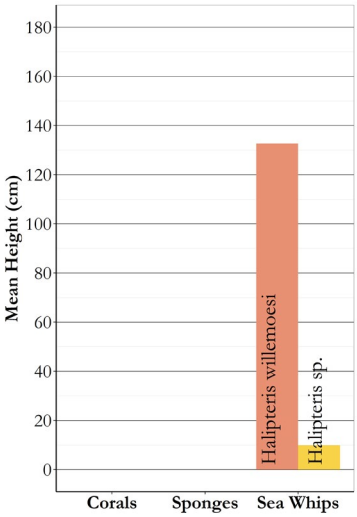
Fish and Crab Composition (n = 68)





Substrate Composition





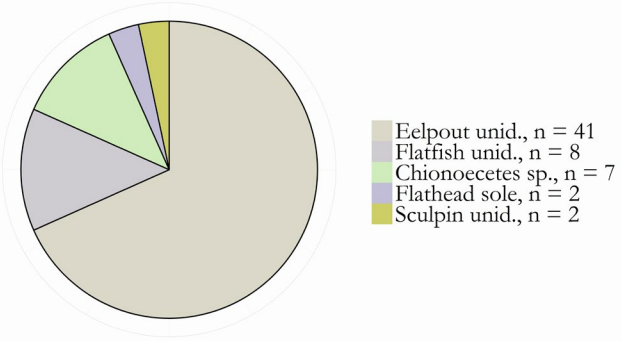
Images

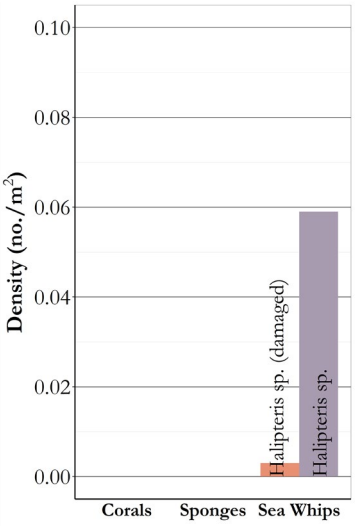
Summary - description of transect

Transect 80: Primary and secondary substrates consisted of sand and mud. Overall fish and crab density was 0.12 individuals/m^2. Species composition was dominated by eelpouts. The next most abundant taxa were flatfishes. Vertical habitat consisted of 23 sea whips, 13 of which were damaged. Two sea whips were measured at 9.8 cm and 132.7 cm. No other corals or sponges were observed.

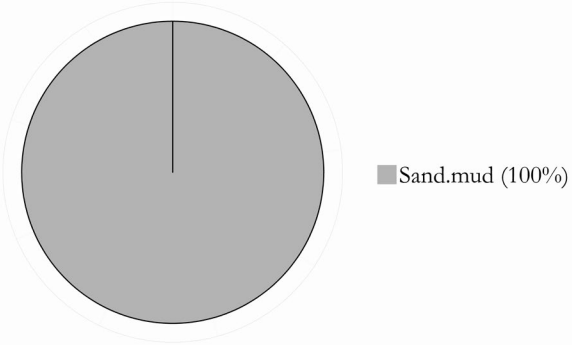
Area: Outer Shelf					Transect 81
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/18/14	56.13	-170.00	975	120	4 4

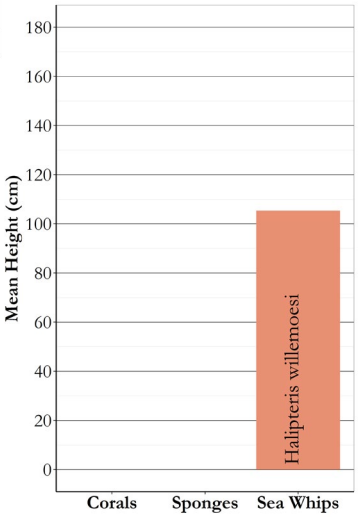
Fish and Crab Composition (n = 60)



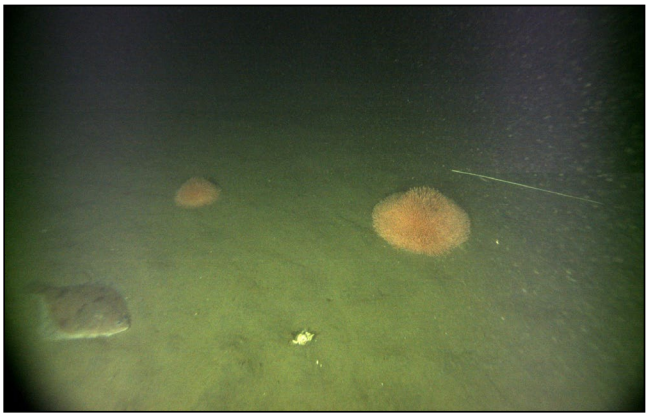


Substrate Composition





Images

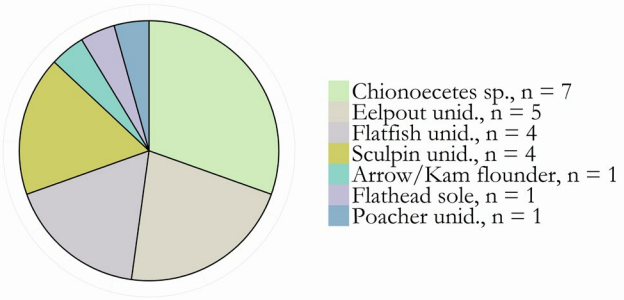


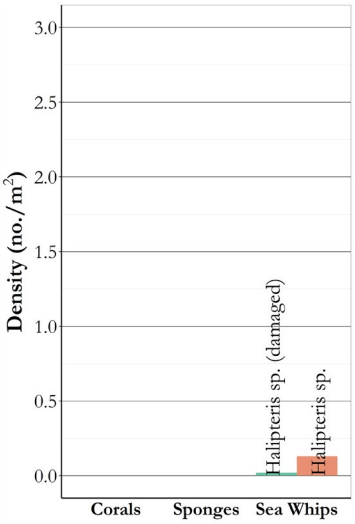
Summary - description of transect

Transect 81: Primary and secondary substrates consisted entirely of sand and mud. Eelpouts were 79% of the fish and crab composition. Flatfishes and sculpins were the next most abundant taxa. Overall density for fishes and crabs was 0.06 individuals/m^2. Sixty-two sea whips were observed, and averaged 105.4 cm. No other corals or sponges were identified.

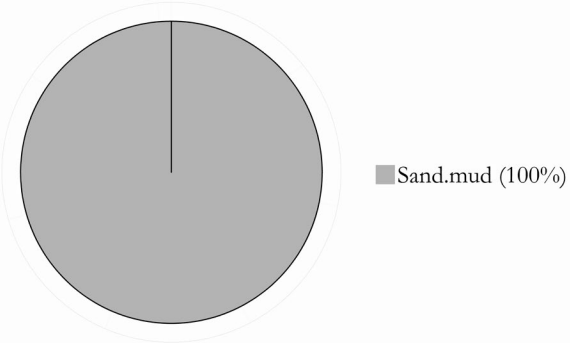
Area: Outer Shelf					Transect 82
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/18/14	56.10	-169.95	1,115	123	NA

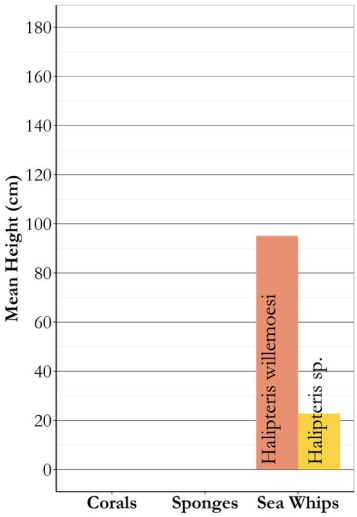
Fish and Crab Composition (n = 23)



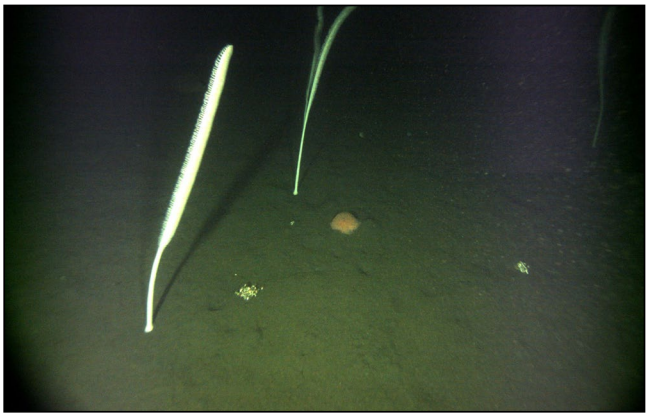


Substrate Composition





Images

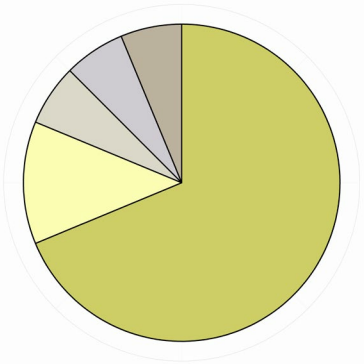


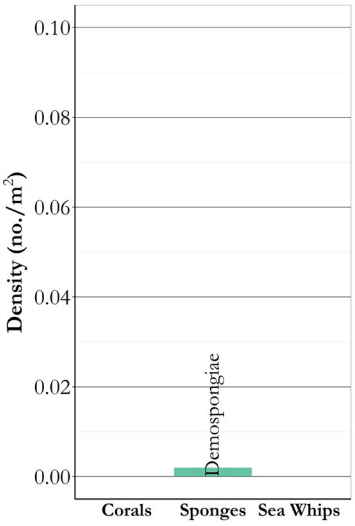
Summary - description of transect

Transect 82: Primary and secondary substrates consisted entirely of sand and mud. *Chionoecetes* sp., eelpouts, flatfishes and sculpins comprised 87% of the species composition, and species density for the transect was 0.02 individuals/m^2. One hundred sixty-seven sea whips (22 damaged) were observed with a mean height of 92.9 cm. No other corals or sponges were identified.

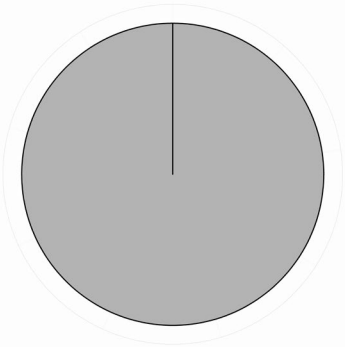
Area: Outer Shelf					Transect 83
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/18/14	56.03	-169.89	653	131	4 3

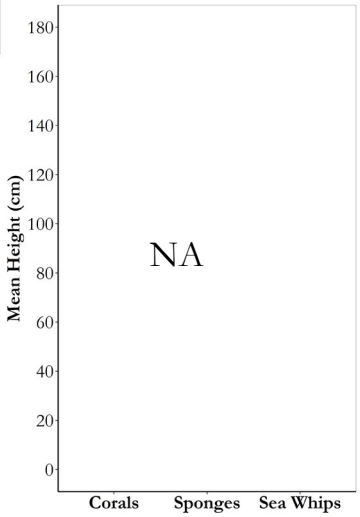
Fish and Crab Composition (n = 16)





Substrate Composition



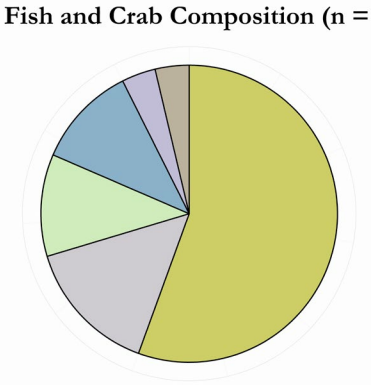


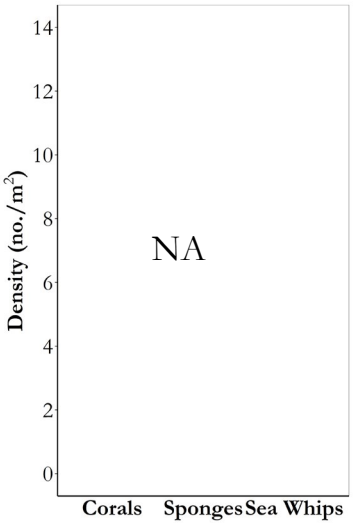
Images

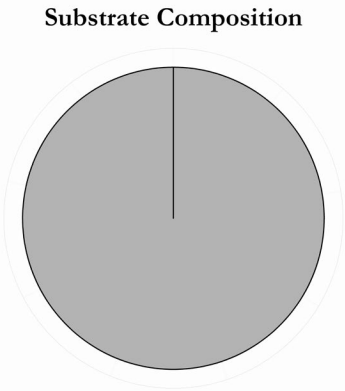
Summary - description of transect

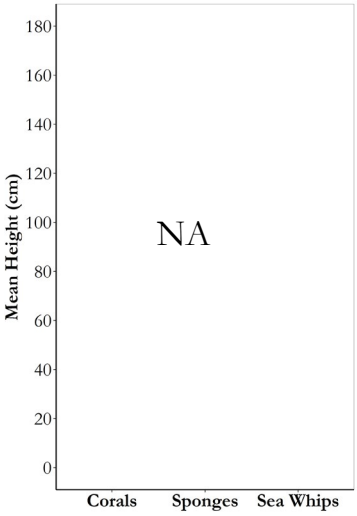
Transect 83: Primary and secondary substrates consisted entirely of sand and mud. Species density for the transect was low (0.02 individuals/m^2) with only 16 individuals identified. Sculpins comprised 69% of the species composition. One Demospongiae was observed. No corals were identified.

Area: Outer Shelf					Transect 86
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/18/14	56.05	-170.05	552	128	4 3







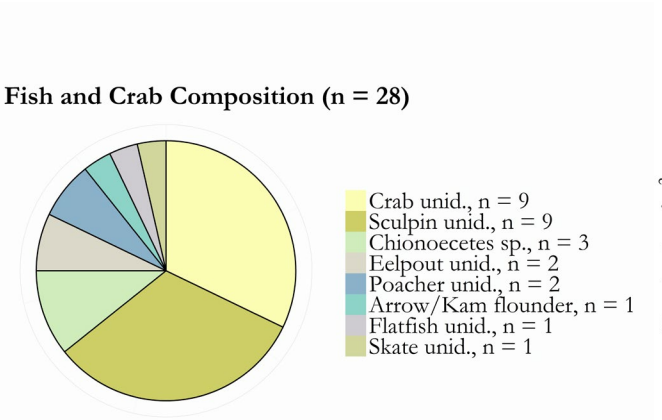


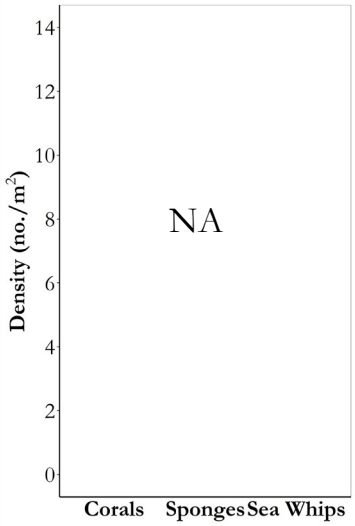
Images

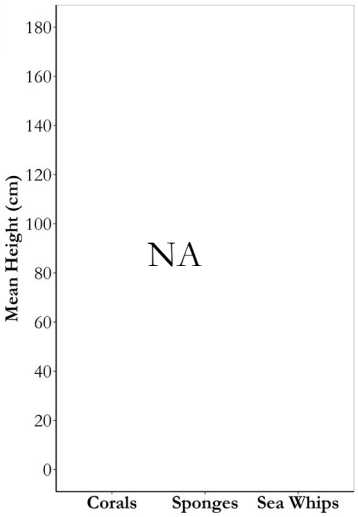
Summary - description of transect

Transect 86: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.05 individuals/m^2. Twenty-four fishes and 3 crabs were identified. Sculpins accounted for 56% of the taxa. Flatfishes (15%), *Chionoecetes* sp. (11%), and poachers (11%) were the next most abundant taxa. No corals or sponges were observed.

Area: Outer Shelf					Transect 91
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/18/14	56.08	-170.29	639	135	4 3





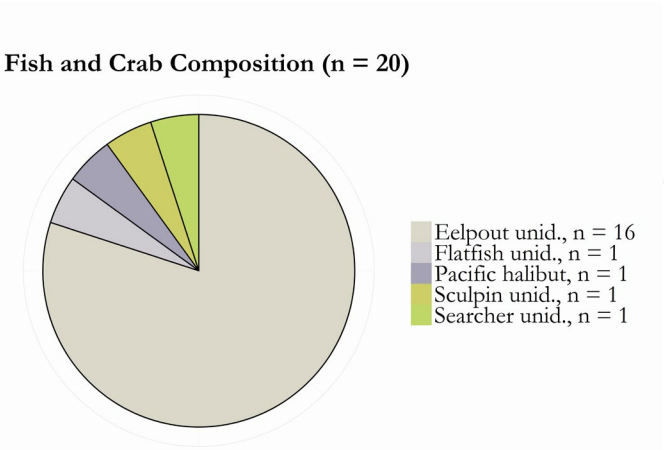


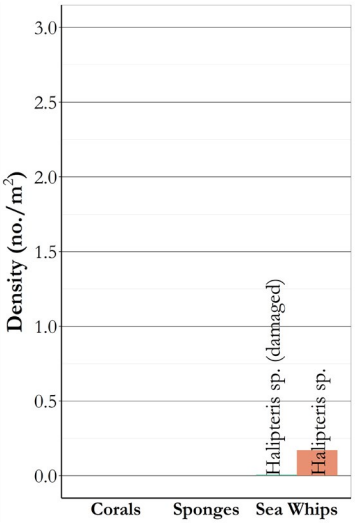
Images

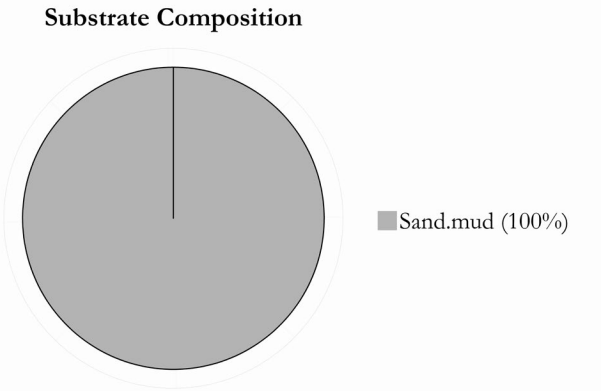
Summary - description of transect

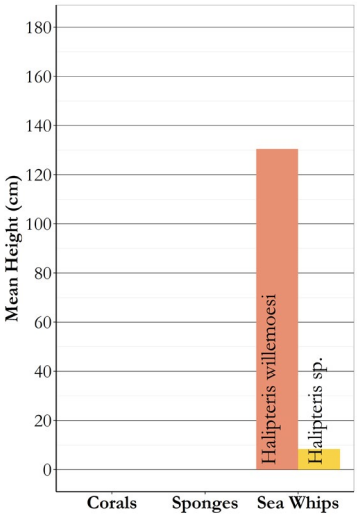
Transect 91: Primary and secondary substrates consisted of sand and mud . Overall fish and crab density was 0.04 individuals/m^2. Sculpins and other crabs accounted for 64% of the enumerated taxa. The next most abundant taxa were *Chionoecetes* sp. at 11%. No vertical habitat was identified.

Area: Outer Shelf					Transect 92
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/18/14	56.18	-170.26	1,174	118	4 4









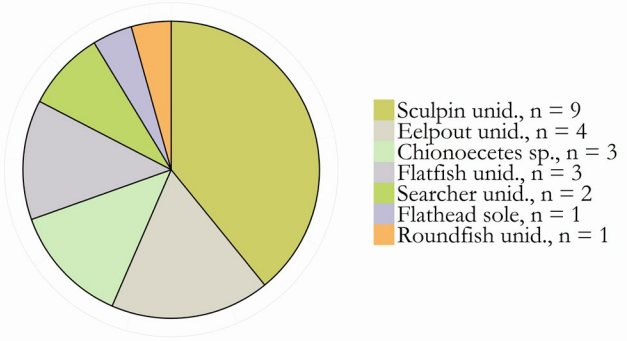
Images

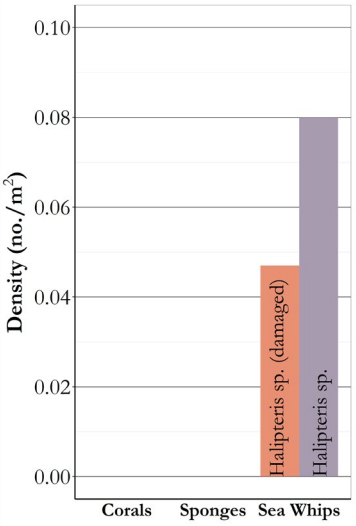
Summary - description of transect

Transect 92: Primary and secondary substrates consisted of sand and mud. Overall fish and crab density was 0.02 individuals/m^2. Eelpouts accounted for 80% of the enumerated taxa. Vertical habitat consisted of 200 sea whips (8 damaged), with a density of 0.18 individuals/m^2. *Halipteris willemoesi* heights ($n = 5$) ranged from 105.8 cm to 166.6 cm with a mean of 105.8 cm., while *Halipteris* sp. heights ($n = 2$) ranged from 6.3 cm to 10.5 cm, with a mean of 8.4 cm. No other corals or sponges were observed.

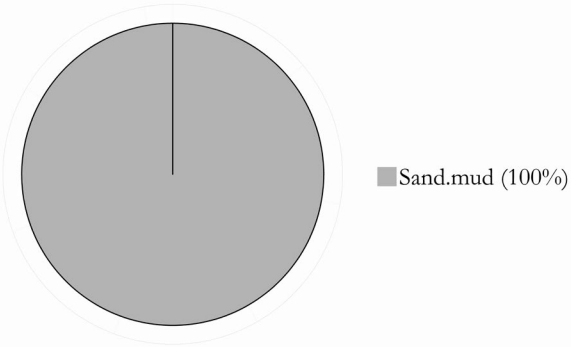
Area: Outer Shelf					Transect 101
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/19/14	56.22	-170.68	710	127	4 3

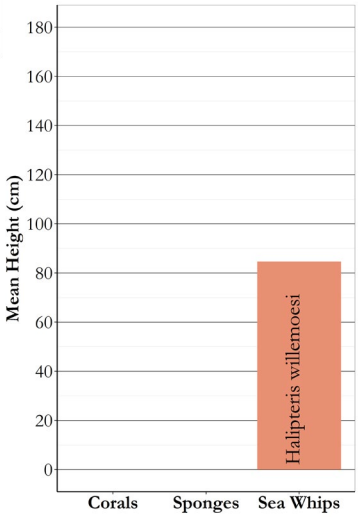
Fish and Crab Composition (n = 23)



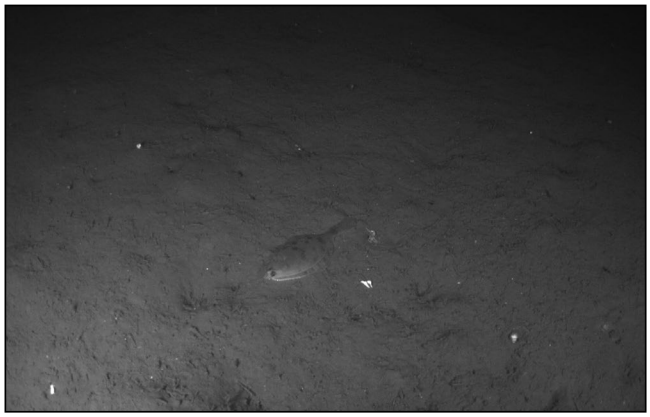


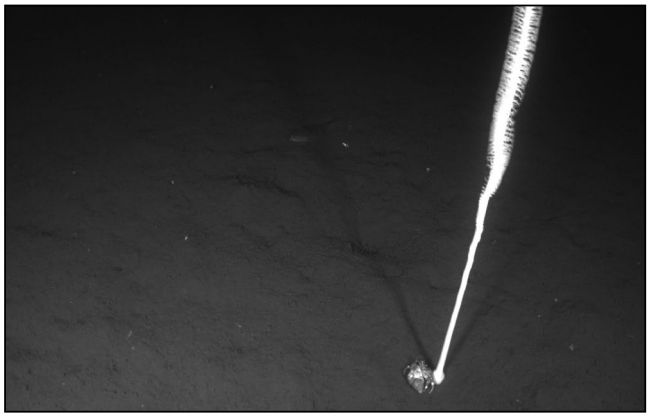
Substrate Composition





Images

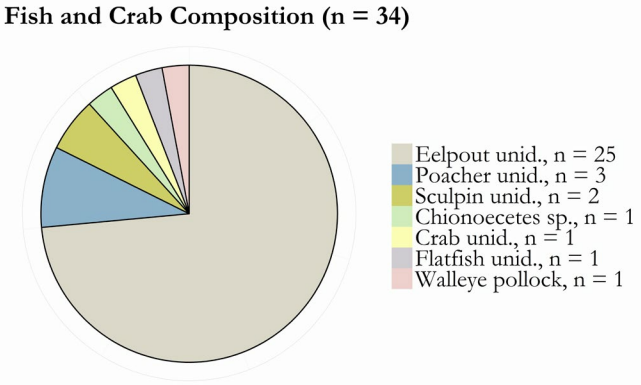


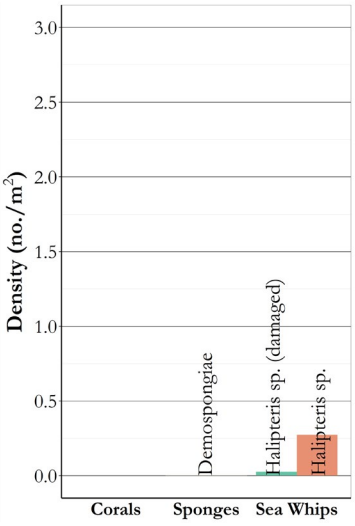


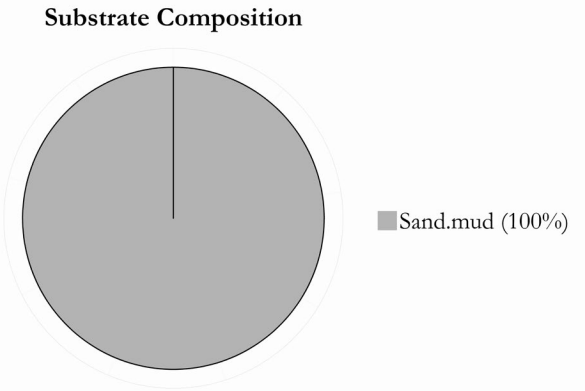
Summary - description of transect

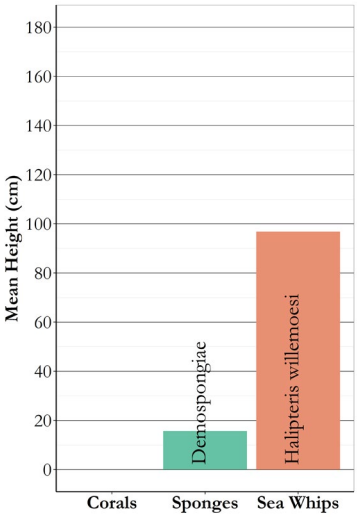
Transect 101: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.03 individuals/m^2. Sculpins accounted for 39% of the enumerated taxa. Eelpouts, *Chionoecetes* sp., and flatfishes were 43% of the remaining taxa. Vertical habitat consisted of 90 sea whips (33 damaged), with a density of 0.13 individuals/m^2. Sea whip heights ranged from 64.4 cm to 116.2 cm with a mean of 84.6 cm. No other corals or sponges were observed.

Area: Outer Shelf					Transect 104
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/19/14	56.40	-170.89	970	122	4 3

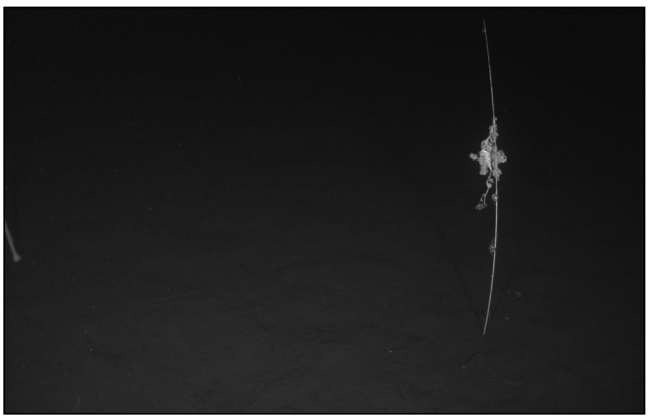


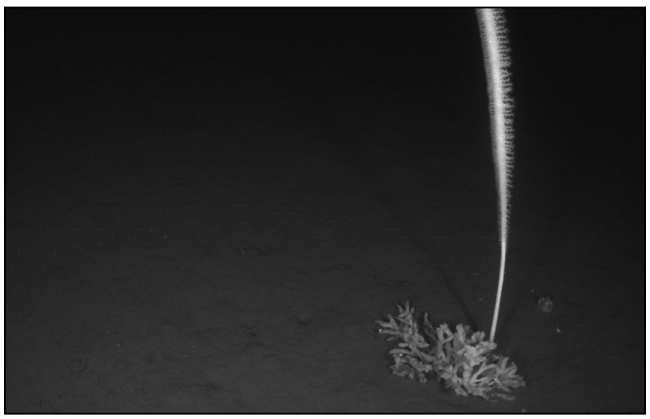






Images



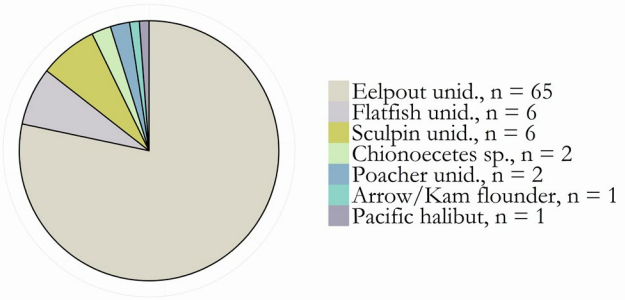


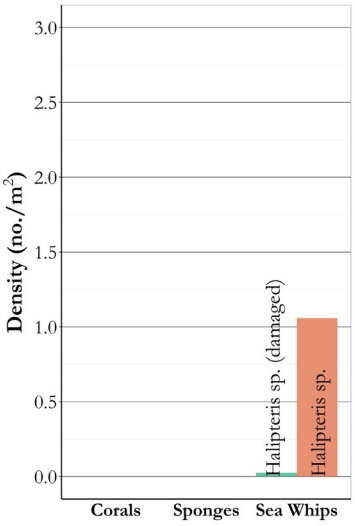
Summary - description of transect

Transect 104: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.04 individuals/m^2. Eelpouts dominated the transect accounting for 74% of the enumerated taxa. The remaining 26% of the transect was comprised of crabs flatfishes, poachers, sculpins, and a walleye pollock. Vertical habitat consisted of 290 sea whips and 1 Demospongiae, with a combined density of 0.30 individuals/m^2. Sea whip heights ($n = 21$) ranged from 74.6 cm to 114.3 cm with a mean of 96.8 cm. The Demospongiae measured 15.7 cm. No other corals were observed.

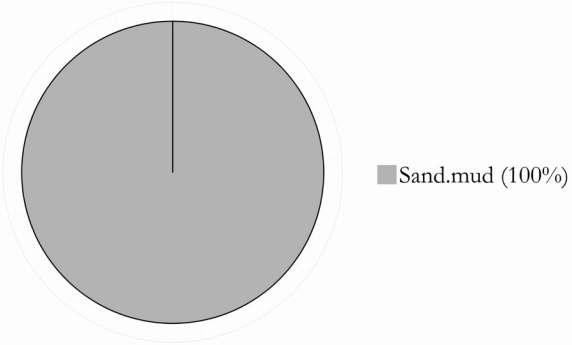
Area: Outer Shelf					Transect 105
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/19/14	56.39	-170.67	1,335	116	4.5

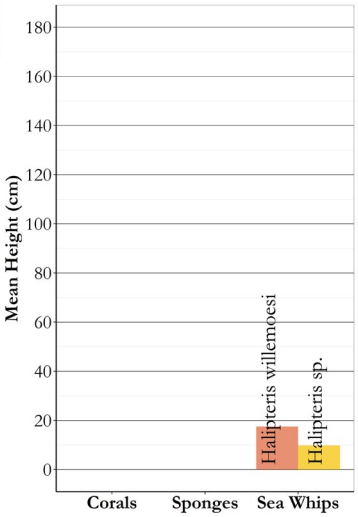
Fish and Crab Composition (n = 83)



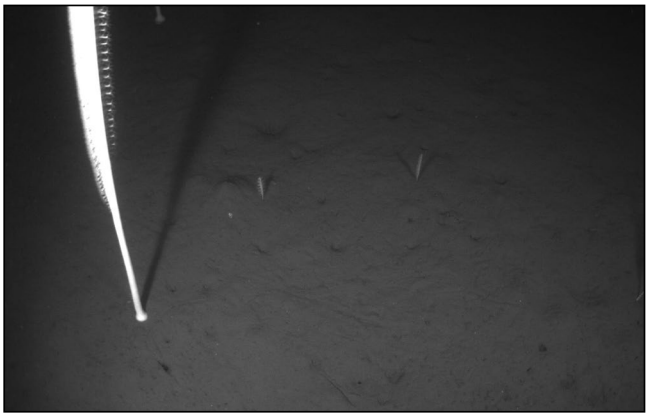


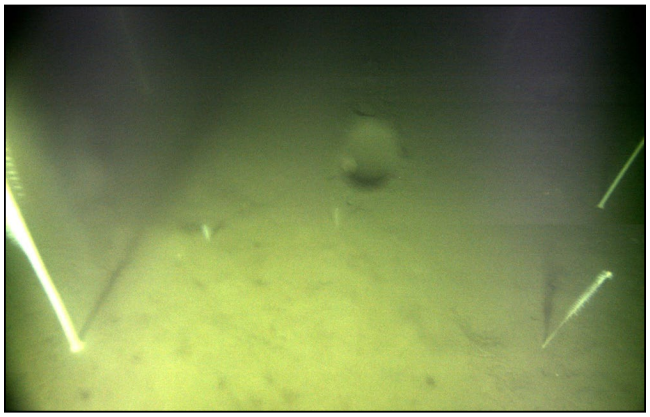
Substrate Composition





Images

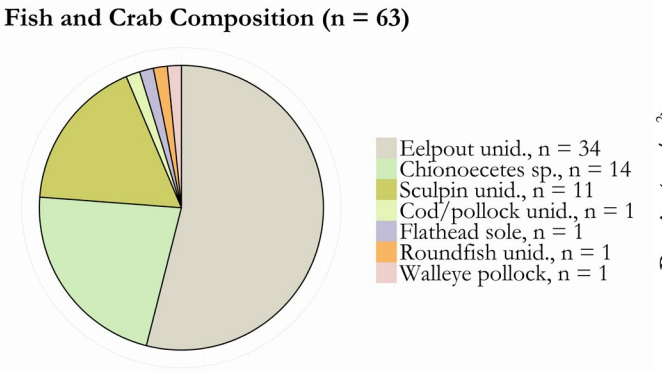


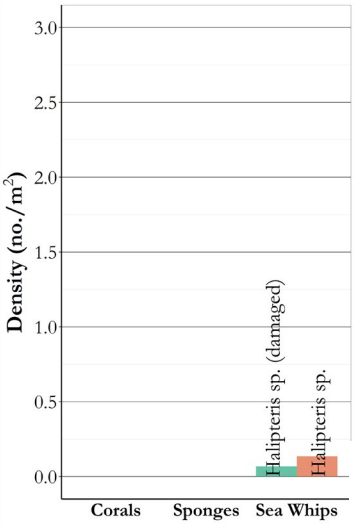


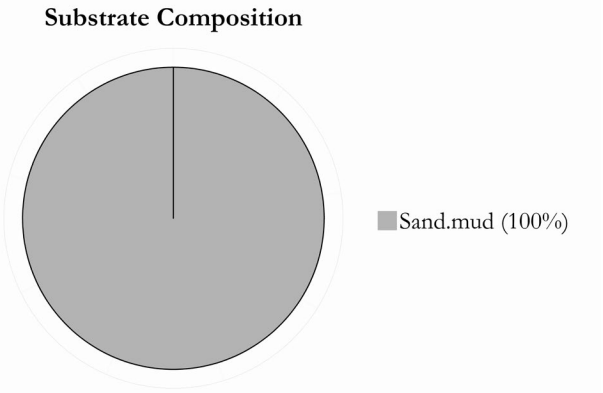
Summary - description of transect

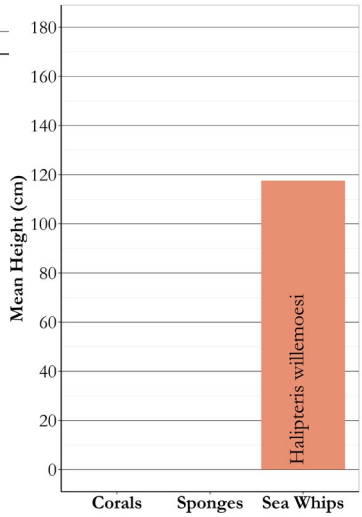
Transect 105: Primary and secondary substrates consisted of sand and mud. Overall fish and crab density was 0.62 individuals/m^2. Eelpouts accounted for 78% of the enumerated taxa. The next most abundant taxa were sculpins at 7%. Vertical habitat consisted of 1,447 sea whips (33 damaged), with a density of 1.08 individuals/m^2. No other corals or sponges were observed.

Area: Outer Shelf					Transect 109
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/20/14	56.32	-171.09	627	133	4 4

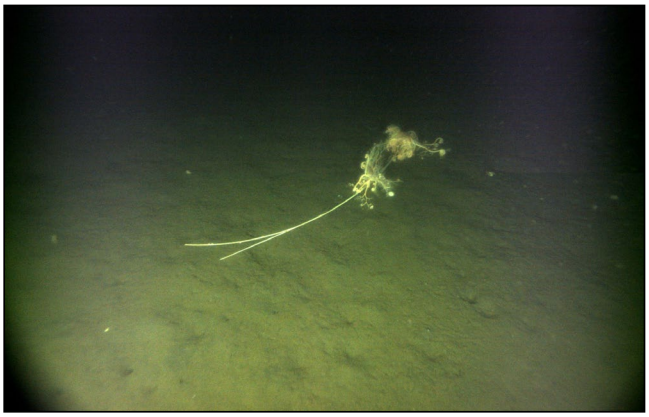


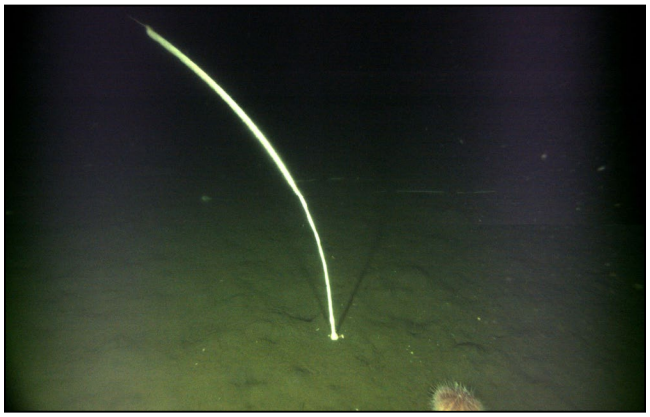






Images



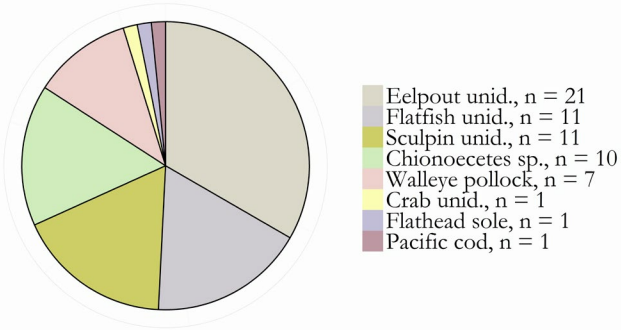


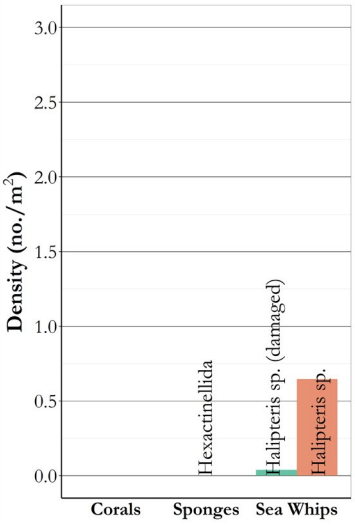
Summary - description of transect

Transect 109: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.10 individuals/m^2. Eelpouts, *Chionoecetes* sp., and sculpins accounted for 94% of the observed individuals. Vertical habitat consisted of 128 sea whips (43 damaged), with a density of 0.20 individuals/m^2. Sea whip heights ($n = 10$) ranged from 77.6 cm to 202.1 cm with a mean of 117.5 cm. No other corals or sponges were observed.

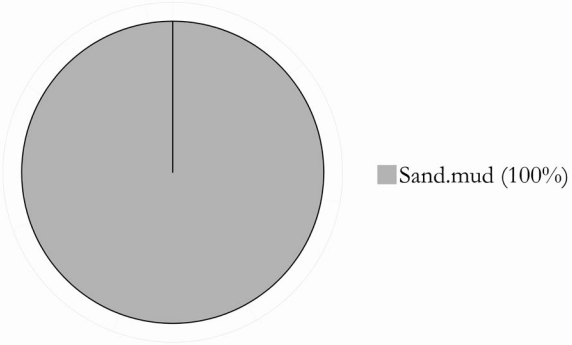
Area: Outer Shelf					Transect 110
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/20/14	56.34	-171.13	1,298	133	4 3

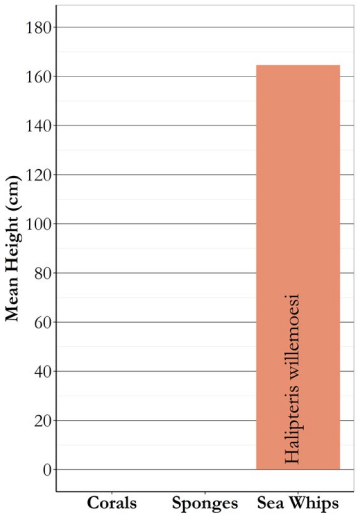
Fish and Crab Composition (n = 63)



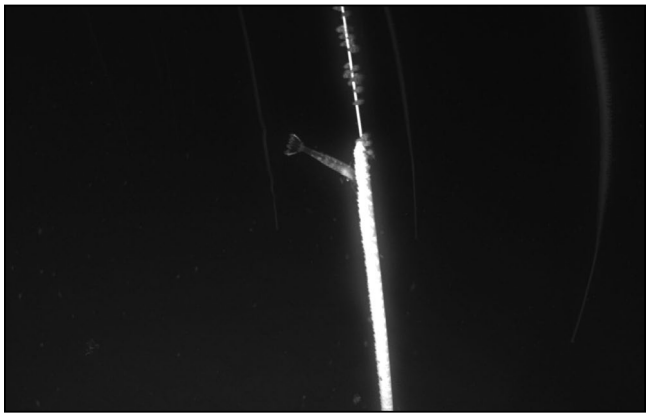


Substrate Composition





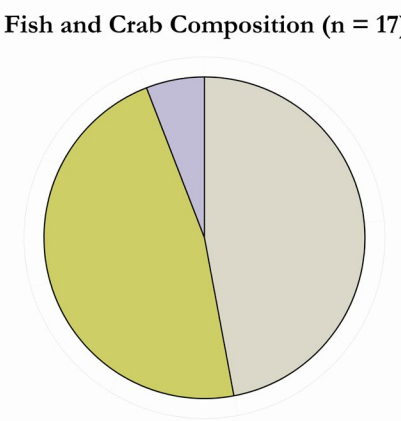
Images

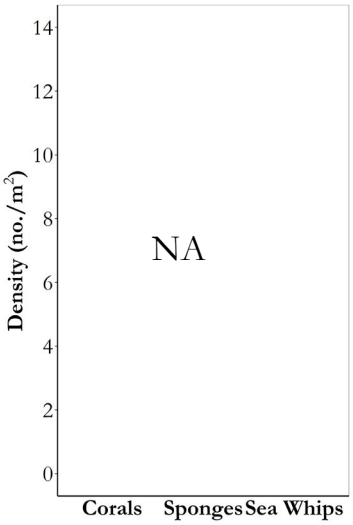


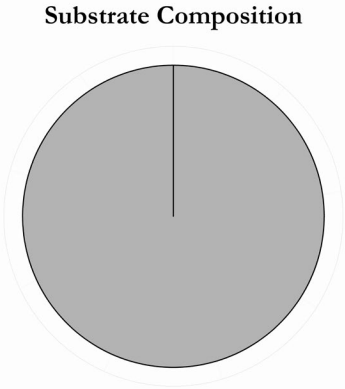
Summary - description of transect

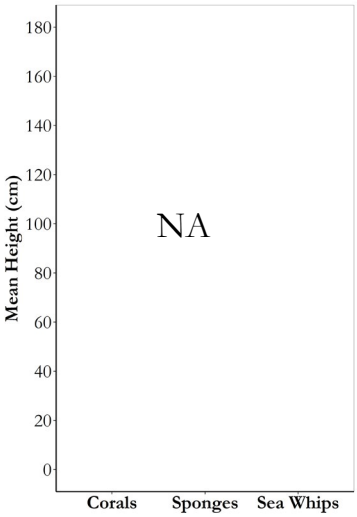
Transect 110: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.05 individuals/m^2. Eelpouts, flatfishes, sculpins, and *Chionoecetes* sp. accounted for 95% of the enumerated taxa. Vertical habitat consisted of 890 sea whips (50 damaged), with a density of 0.69 individuals/m^2. Sea whip heights (n = 54) ranged from 108.1 cm to 230.1 cm with a mean of 164.6 cm. No other corals or sponges were observed.

Area: Outer Shelf					Transect 136
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/22/14	56.76	-173.17	1,004	135	4 2

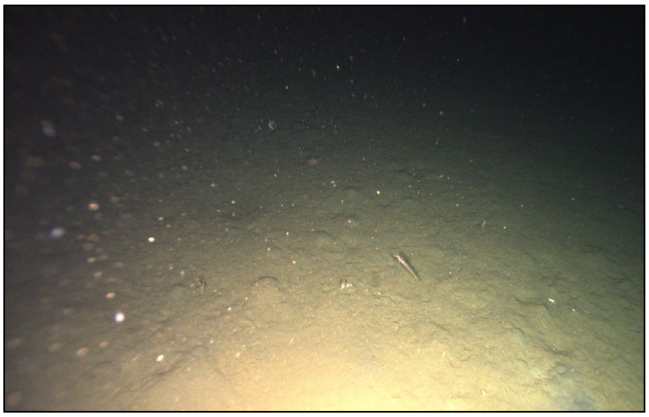








Images

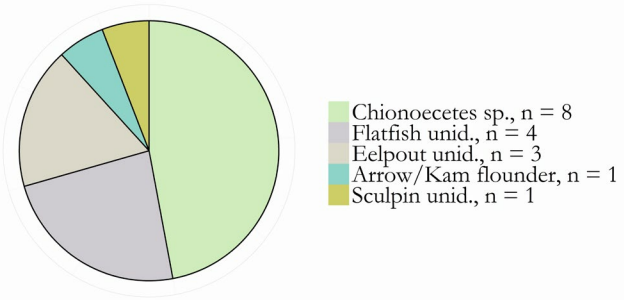


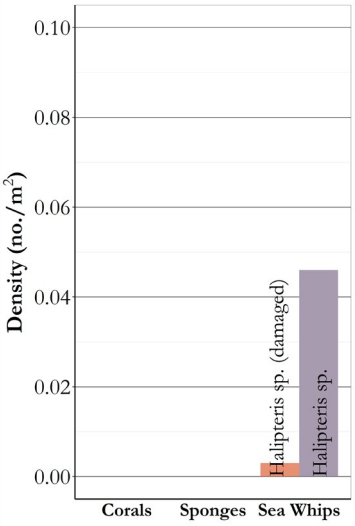
Summary - description of transect

Transect 136: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.02 individuals/m^2. Only 3 taxa, eelpouts, flathead sole, and sculpins with 17 individuals were identified in Transect 136. Sculpins and eelpouts accounted for 94% of the enumerated taxa. No vertical habitat was observed.

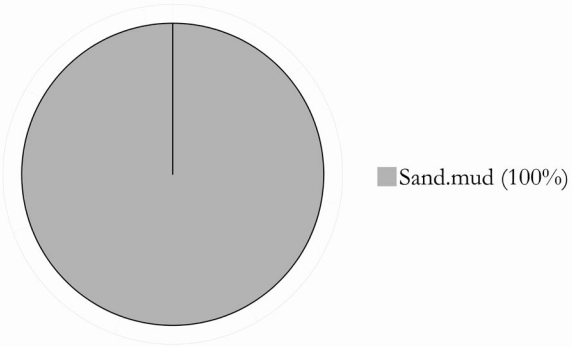
Area: Outer Shelf					Transect 143
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/24/14	56.39	-170.40	865	112	4 4

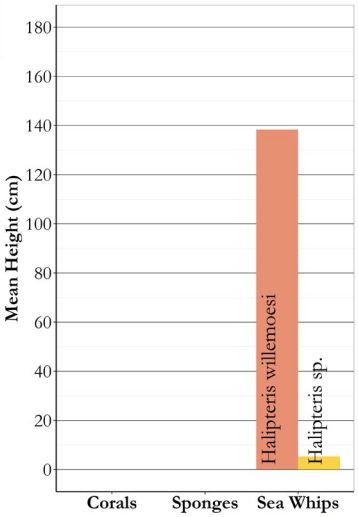
Fish and Crab Composition (n = 17)



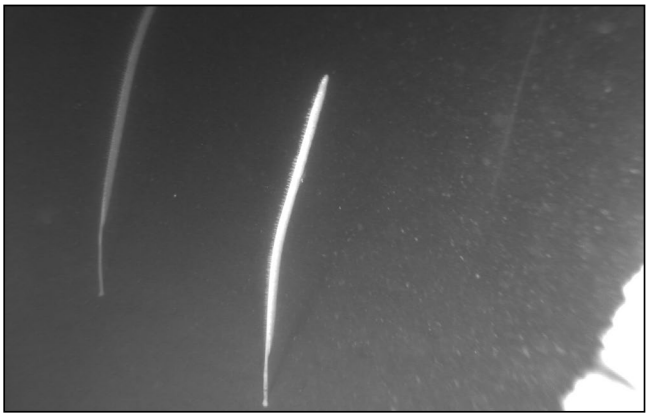


Substrate Composition





Images

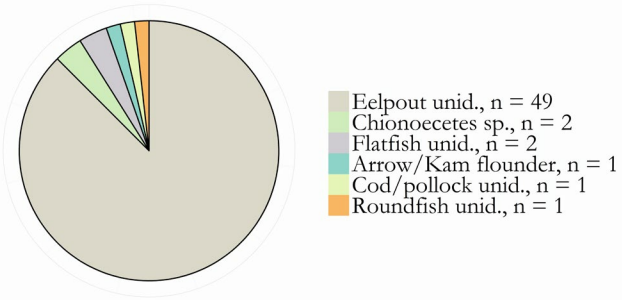


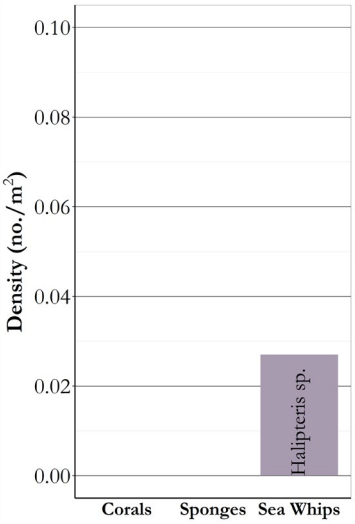
Summary - description of transect

Transect 143: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.02 individuals/m^2. *Chionoecetes* sp. accounted for 47% of the enumerated taxa. The next most abundant taxa were eelpouts and flatfishes at 42%. Vertical habitat consisted of 43 sea whips (3 damaged), with a density of 0.05 individuals/m^2. Sea whips were identified as *Halipteris* sp and *Halipteris willemoesi* for height measurements *Halipteris* sp. heights ($n = 7$) ranged from 2.9 cm to 8.6 cm with a mean of 5.3 cm. *Halipteris willemoesi* heights ($n = 7$) ranged from 106.0 cm to 171.3 cm, with a mean of 138.3 cm. No other corals were observed.

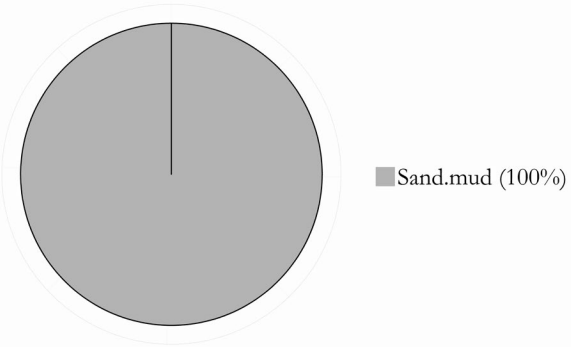
Area: Outer Shelf					Transect 144
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/24/14	56.41	-170.40	755	111	4.5

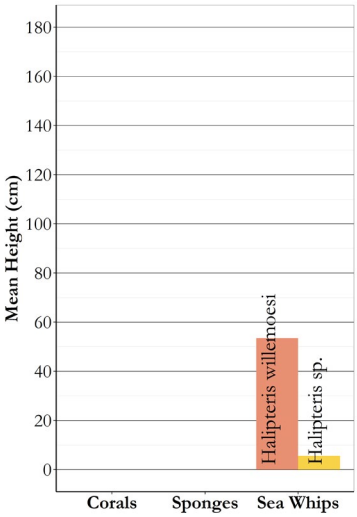
Fish and Crab Composition (n = 56)



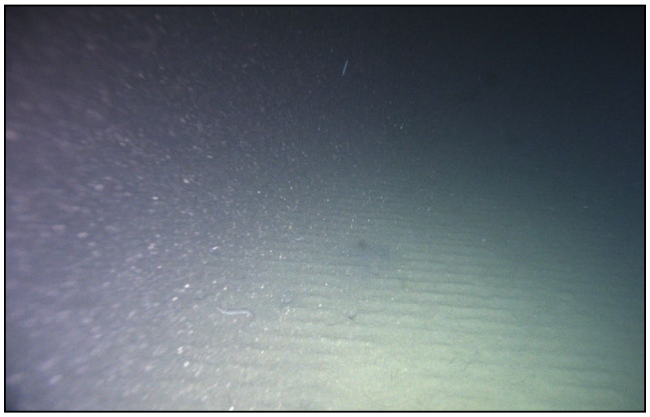


Substrate Composition





Images

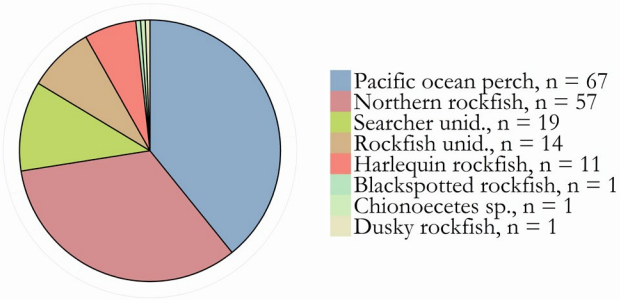


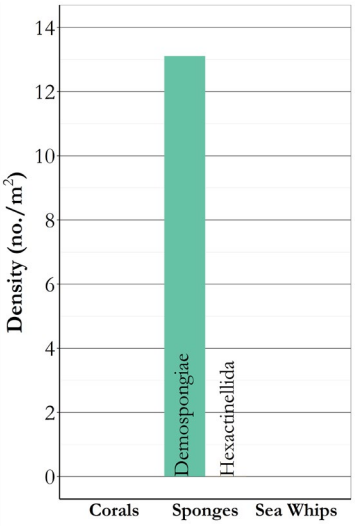
Summary - description of transect

Transect 144: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.07 individuals/m^2. Eelpouts accounted for 88% of the enumerated taxa. Vertical habitat consisted of 20 sea whips, with a density of 0.03 individuals/m^2. Sea whips were identified as *Halipteris* sp and *Halipteris willemoesi* for height measurements . *Halipteris* sp. heights ($n = 5$) ranged from 3.9 cm to 8.4 cm with a mean of 5.6 cm. Only 1 *Halipteris willemoesi* was measured at 53.5 cm. No other corals or sponges were observed.

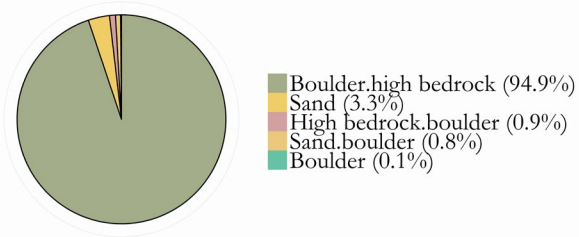
Area: Outer Shelf					Transect 145
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/24/14	56.40	-170.43	1,281	110	4 4

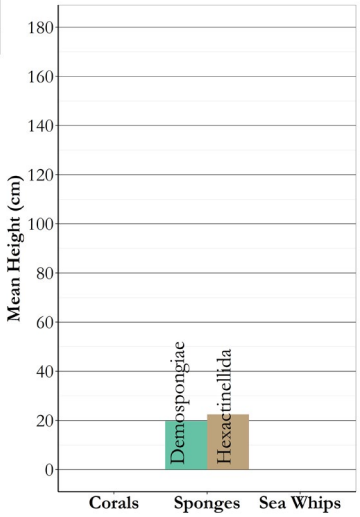
Fish and Crab Composition (n = 171)



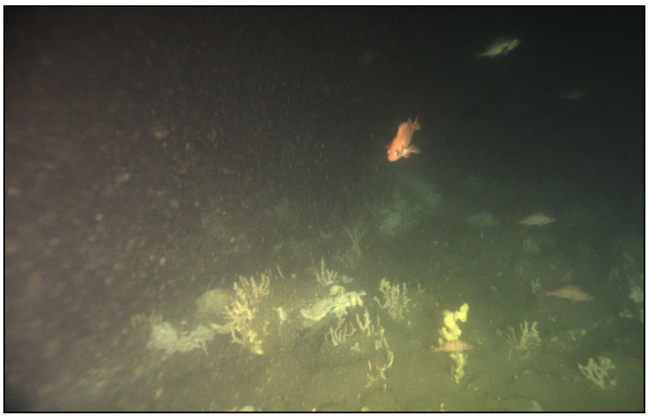


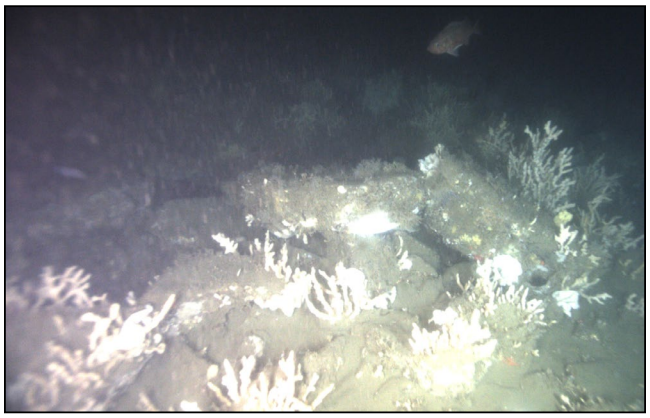
Substrate Composition





Images





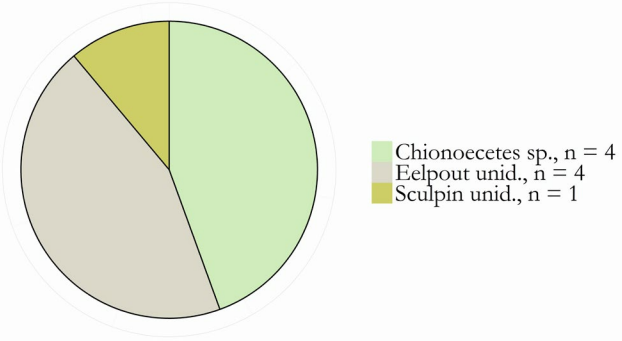
Summary - description of transect

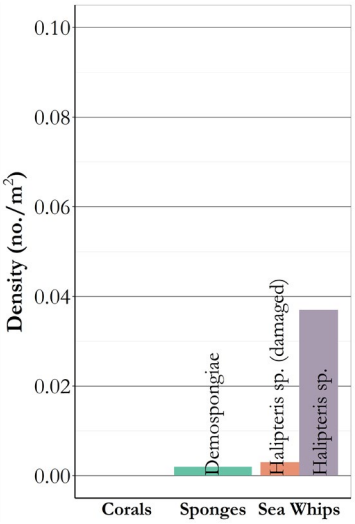
Summary - description of transect

Transect 145: Primary and secondary substrates consisted mostly of boulder and high bedrock respectively. Overall fish and crab density was 0.13 individuals/m^2. Species composition was dominated by rockfishes (88%). Six out of 8 of the enumerated taxa were rockfishes. Pacific ocean perch (39%) and northern rockfish were the most abundant (33%). Vertical habitat consisted of 16,812 Demospongiae and 21 Hexactinellida, with a density of 13.12 individuals/m^2. Demospongiae heights ($n = 535$) ranged from 10.0 cm to 70.7 cm with a mean of 19.8 cm. Hexactinellida heights ($n = 8$) ranged from 13.3 cm to 35.3 cm, with a mean of 19.8 cm. No corals were observed.

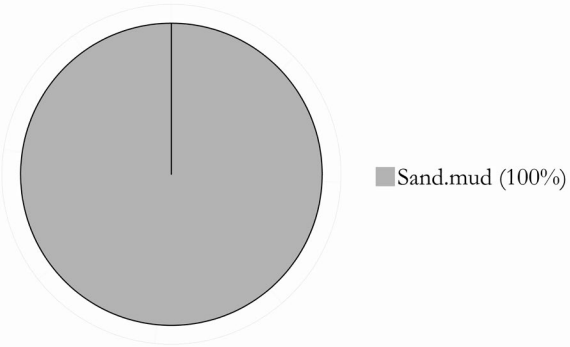
Area: Outer Shelf					Transect 146
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/24/14	56.90	-172.23	1,264	120	4 3

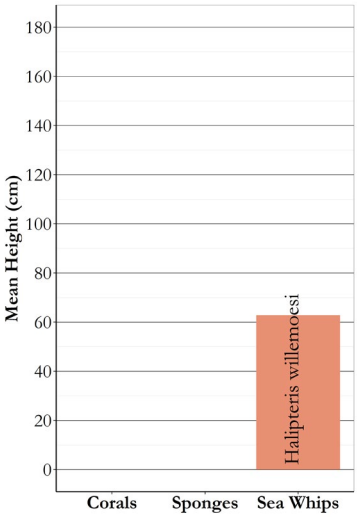
Fish and Crab Composition (n = 9)



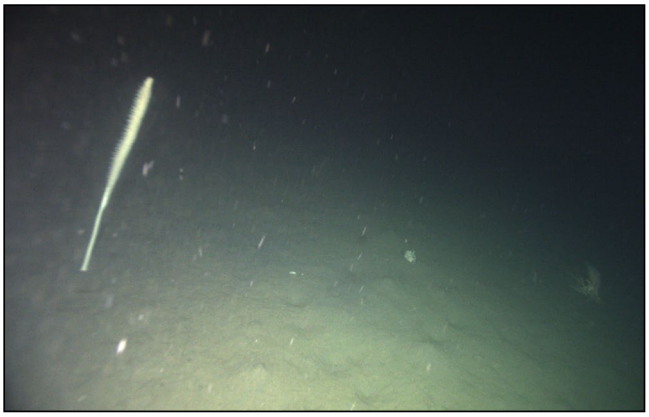


Substrate Composition





Images



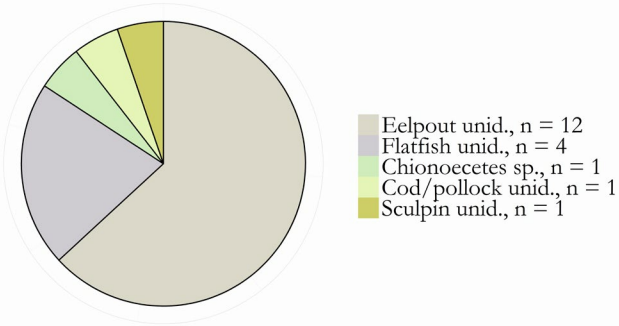
Summary - description of transect

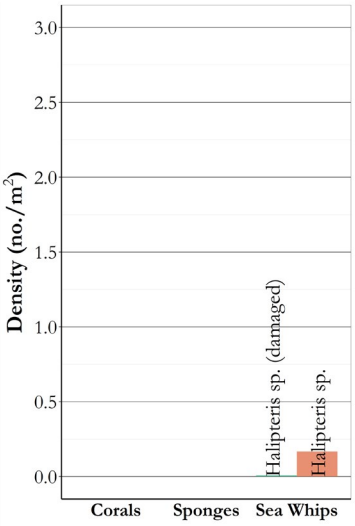
Summary - description of transect

Transect 146: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density (0.01 individuals/m^2) was very low. Only 9 individuals were observed. *Chionoecetes* sp. and eelpouts accounted for 88% of the enumerated taxa. Vertical habitat consisted of 51 *Halipteris willemoesi* (4 damaged) and 3 Demospongiae, with a density of 0.04 individuals/m^2. Sea whip heights ($n = 10$) ranged from 27.8 cm to 106.6 cm with a mean of 62.8 cm. No other corals were observed.

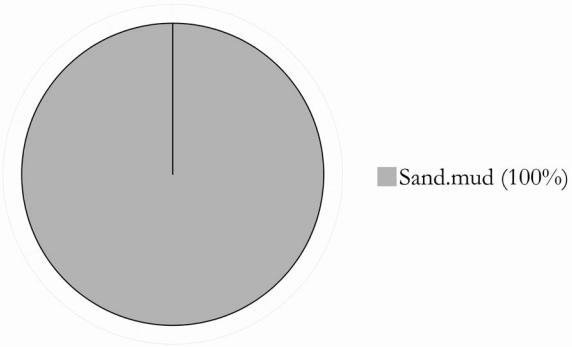
Area: Outer Shelf					Transect 147
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/25/14	56.93	-172.23	1,442	119	4 3

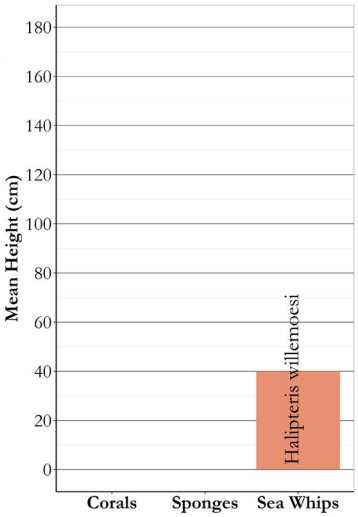
Fish and Crab Composition (n = 19)



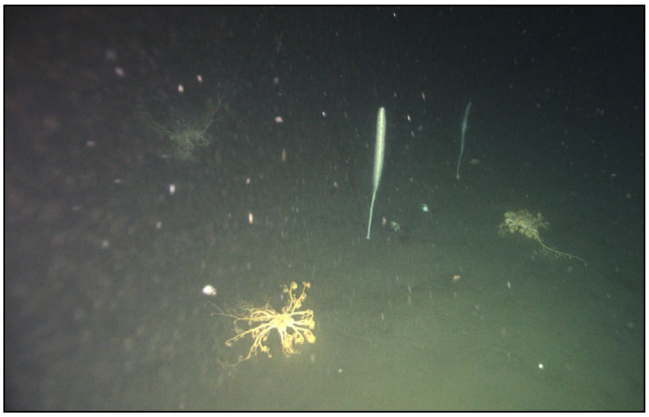


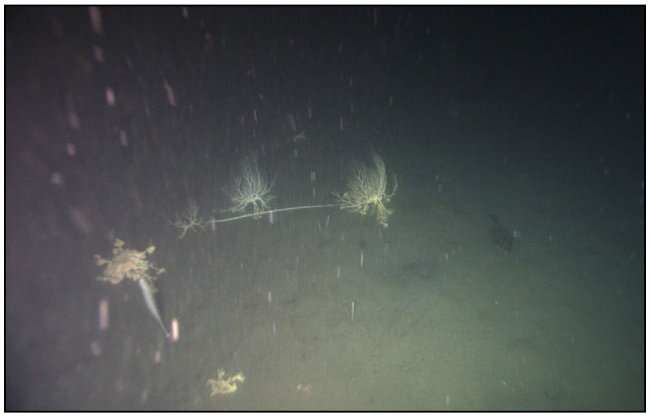
Substrate Composition





Images



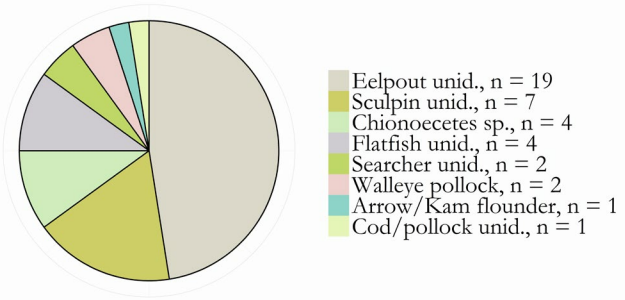


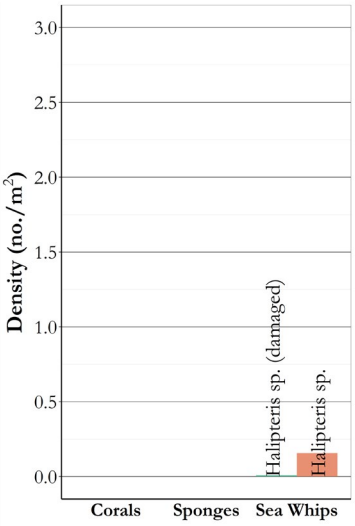
Summary - description of transect

Transect 147: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.01 individuals/m^2. Eelpouts accounted for 63% of the enumerated taxa. The next most abundant taxon was flatfishes at 21%. Vertical habitat consisted of 254 sea whips (12) damaged, with a density of 0.18 individuals/m^2. Sea whip heights ($n = 58$) ranged from 5.9 cm to 85.6 cm with a mean of 39.9 cm. No other corals or sponges were observed.

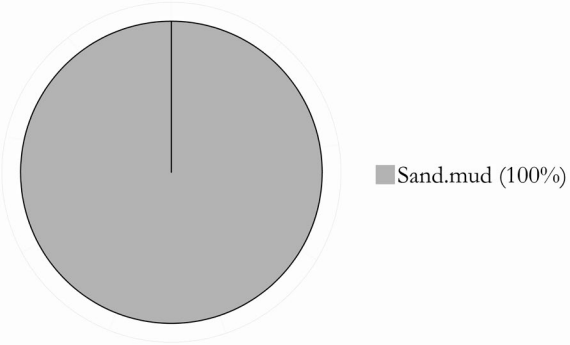
Area: Outer Shelf					Transect 150
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/25/14	57.68	-174.00	1,679	125	4.0

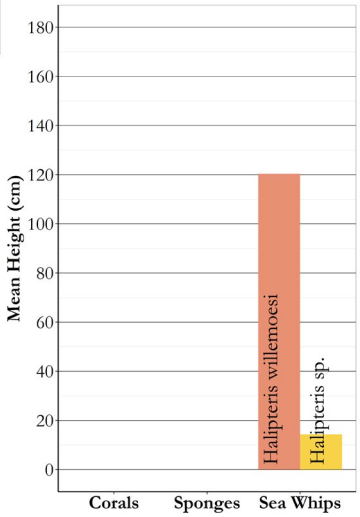
Fish and Crab Composition (n = 40)



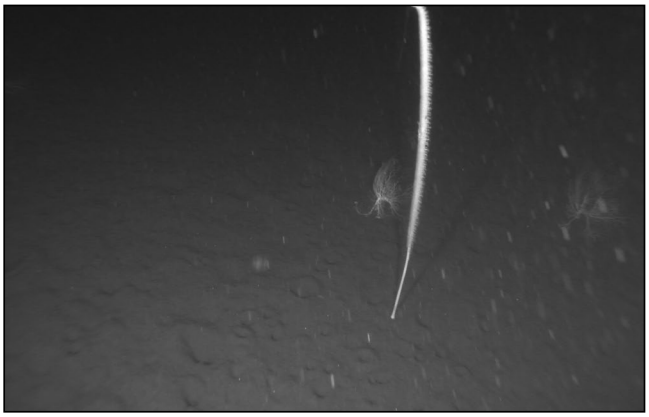


Substrate Composition





Images

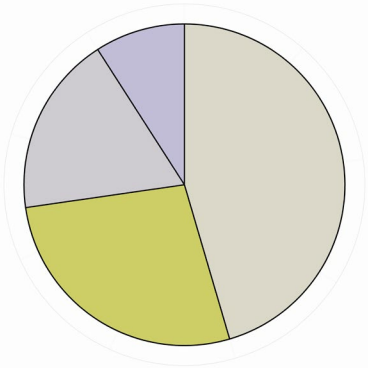


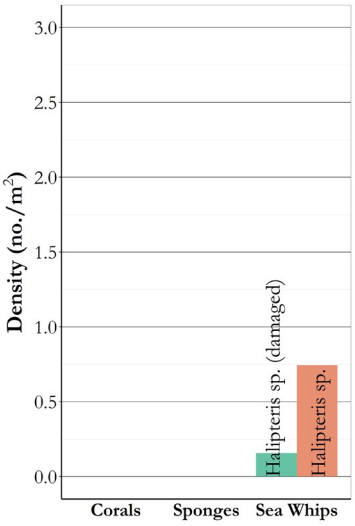
Summary - description of transect

Transect 150: Primary and secondary substrates consisted entirely of sand and mud. Species density was 0.02 individuals/m^2, with eelpouts, flatfishes, and sculpins accounting for 79% of the 40 individuals identified. Vertical habitat was comprised entirely of 278 sea whips (15 were damaged). Sea whip density was 0.17 individuals/m^2. Mean height for 36 measured *Halipteris willemoesi* was 120.3 cm. No other corals or sponges were identified.

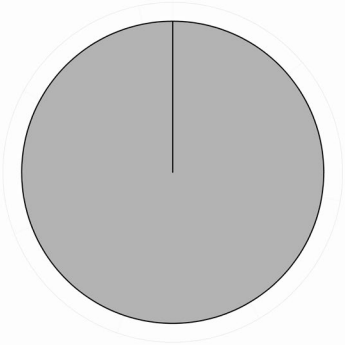
Area: Outer Shelf					Transect 152
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/25/14	57.66	-174.09	1,383	133	4.1

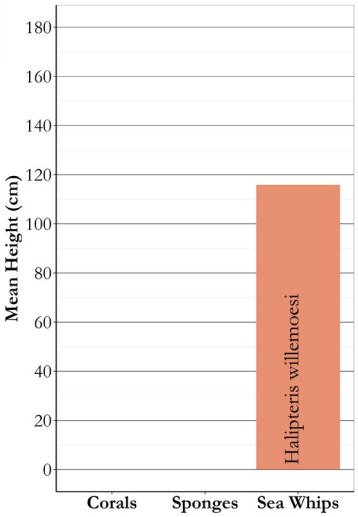
Fish and Crab Composition (n = 11)



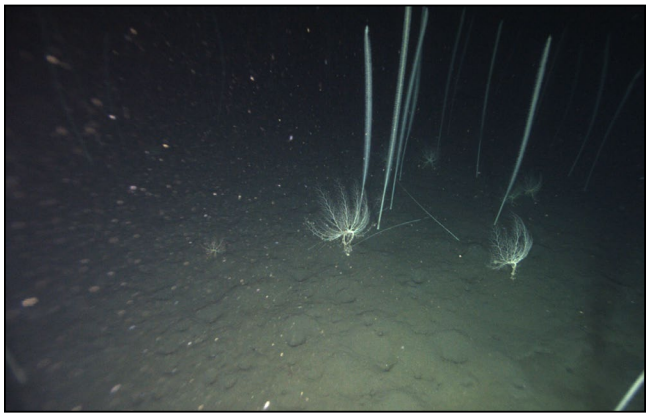


Substrate Composition





Images

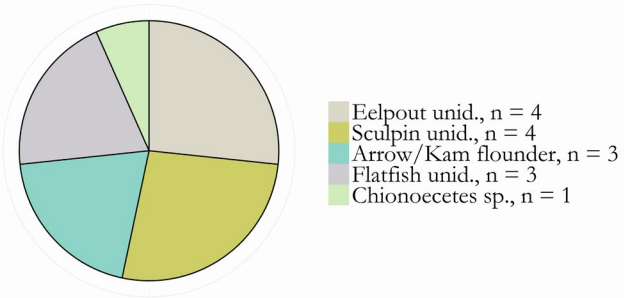


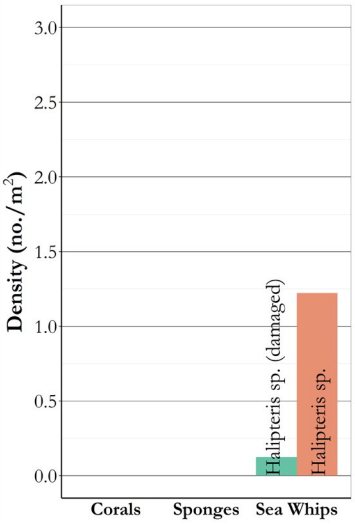
Summary - description of transect

Transect 152: Primary and secondary substrates consisted entirely of sand and mud. Fish density was low (0.01 individuals/m^2), with only 11 individuals counted. Vertical habitat consisted of 1246 sea whips (217 damaged). Sea whip density was 0.90 individuals/m^2. Mean height for 90 measured *Halipteris willemoesi* was 115.8 cm. No other corals or sponges were identified.

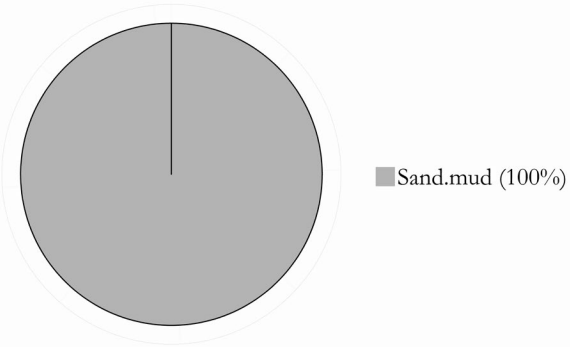
Area: Outer Shelf					Transect 153
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/25/14	57.64	-174.08	1,665	133	4.1

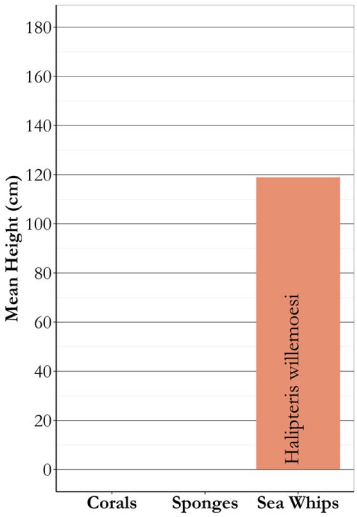
Fish and Crab Composition (n = 15)



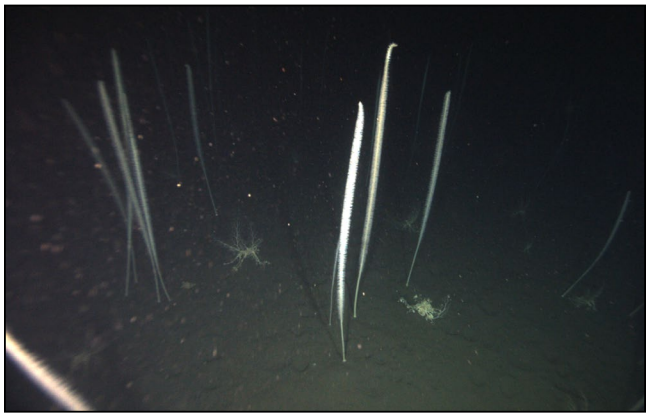


Substrate Composition





Images

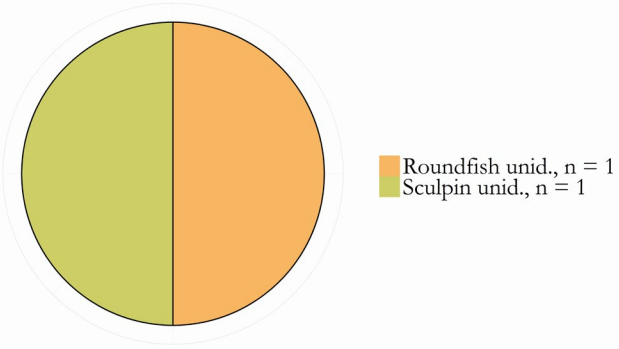


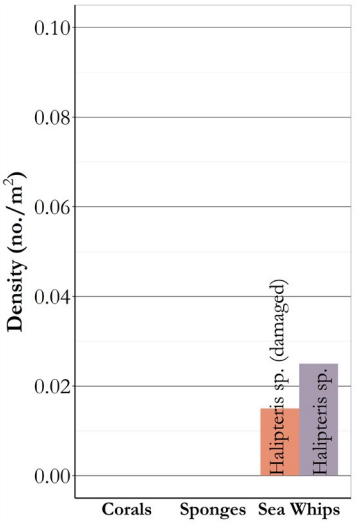
Summary - description of transect

Transect 153: Primary and secondary substrates consisted of sand and mud. Species density was low (0.01 individuals/m^2), with only 15 individuals counted. Vertical habitat consisted of 2,244 sea whips (208 damaged). Sea whip density was 1.3 individuals/m^2. Mean height for *Halipteris willemoesi* ($n = 106$) was 118.9 cm. No other corals or sponges were identified.

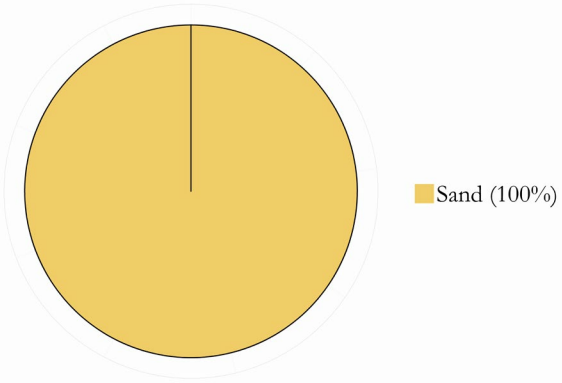
Area: Outer Shelf					Transect 159
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/26/14	57.64	-173.81	1,010	129	4.1

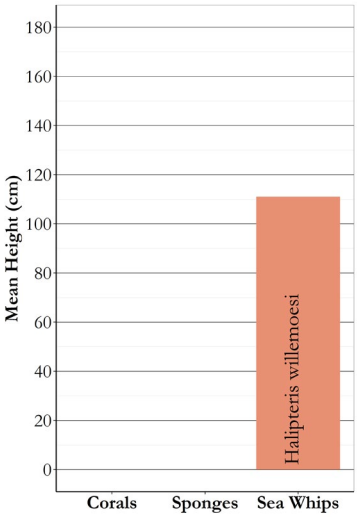
Fish and Crab Composition (n = 2)



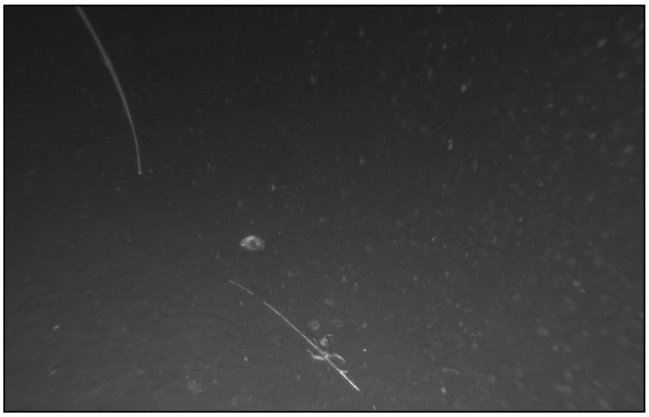


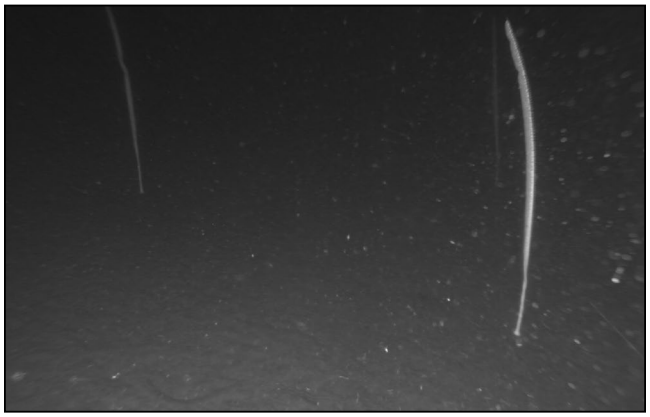
Substrate Composition





Images

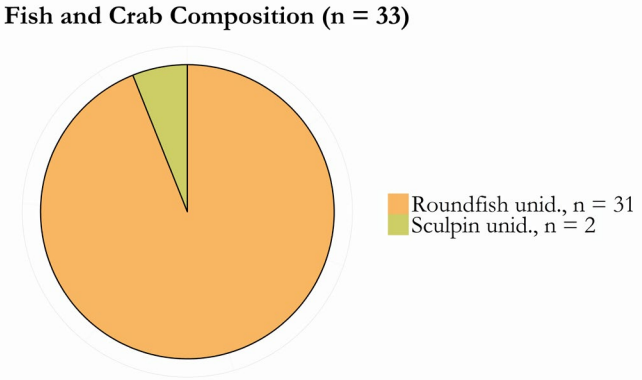


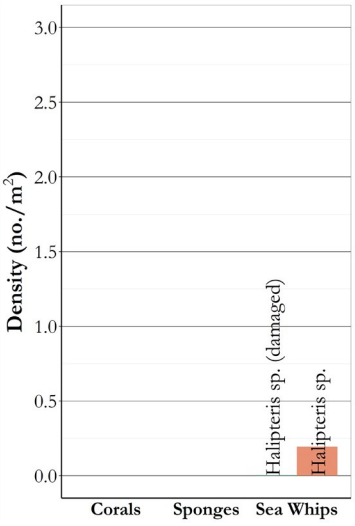


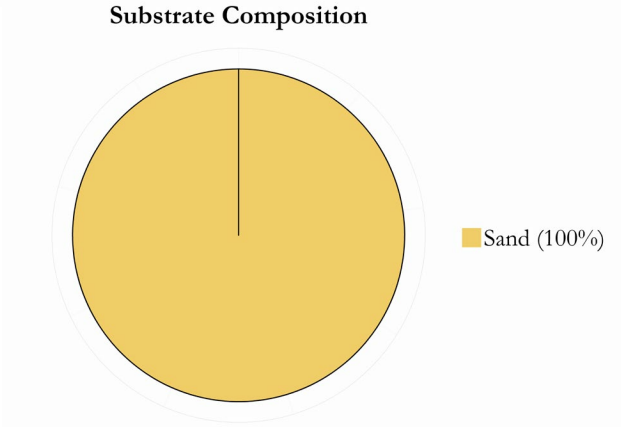
Summary - description of transect

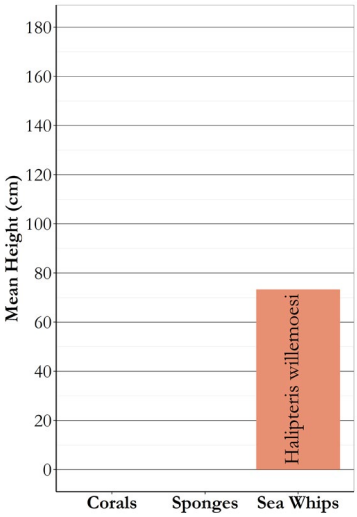
Transect 159: Primary and secondary substrates consisted entirely of sand. Only 2 individuals were counted for this transect, resulting in a low species density (< 0.01 individuals/m^2). Vertical habitat consisted of 40 sea whips (15 damaged). Sea whip density was 0.04 individuals/m^2. Mean height for 5 measured *Halipteris willemoesi* was 111.0 cm. No other corals or sponges were identified.

Area: Outer Shelf					Transect 160
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/26/14	57.41	-173.52	1,721	121	4 2

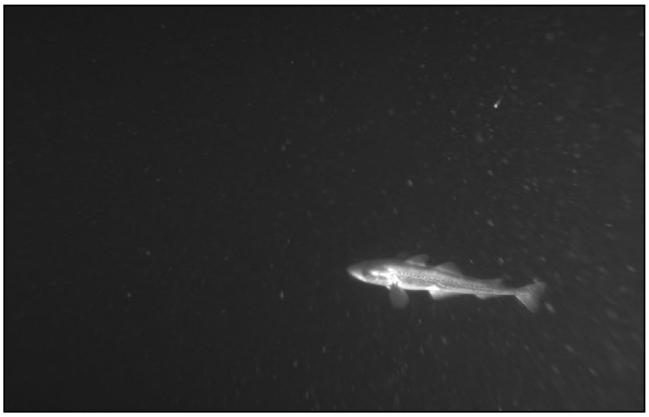


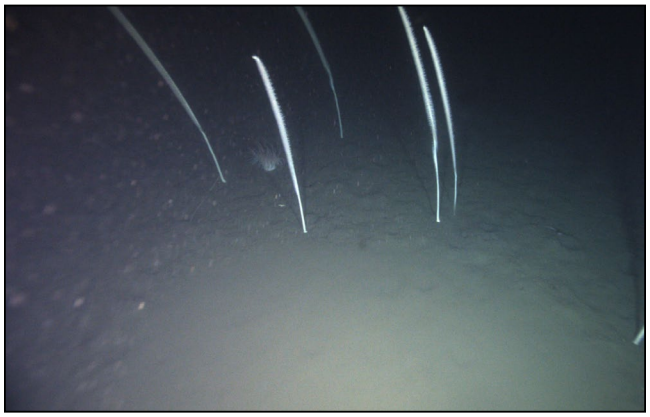






Images



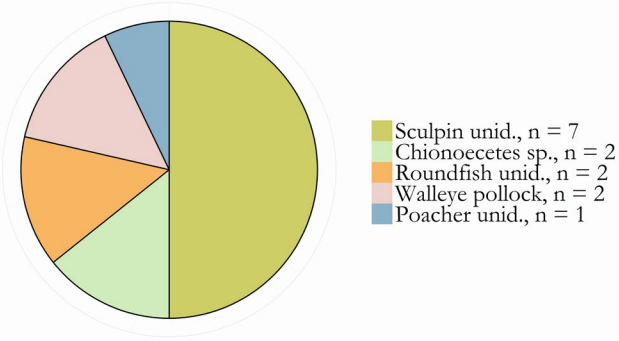


Summary - description of transect

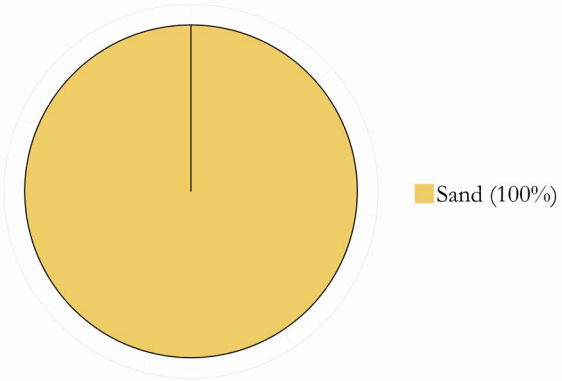
Transect 160: Primary and secondary substrates consisted entirely of sand and mud. Overall fish and crab density was 0.02 individuals/m^2. Only 33 individuals from 2 taxa were identified. Unidentified roundfishes accounted for 94% of the enumerated taxa. Vertical habitat consisted of 342 *Halipteris willemoesi* (7 damaged,) with a density of 0.20 individuals/m^2. *Halipteris willemoesi* ($n = 38$) ranged from 4.1 cm to 142.5 cm with a mean of 73.3 cm. No other corals or sponges were observed.

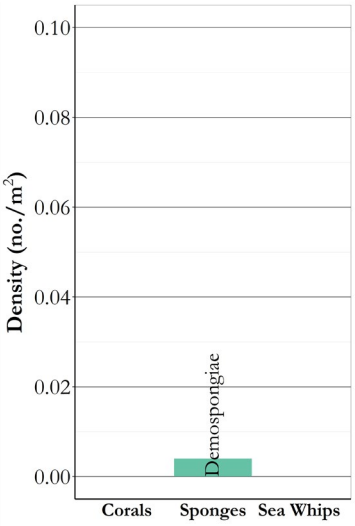
Area: Outer Shelf					Transect 169
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/27/14	57.63	-173.74	496	125	4.1

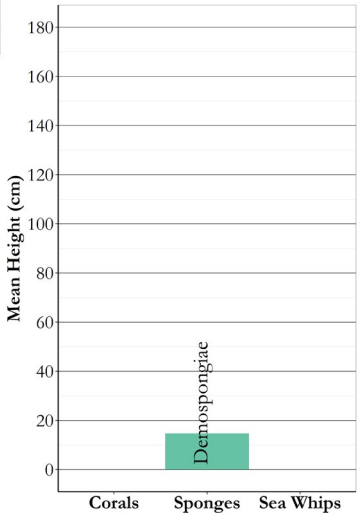
Fish and Crab Composition (n = 14)



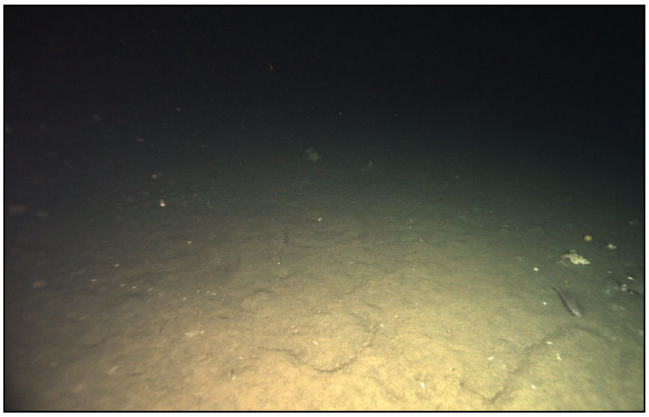
Substrate Composition

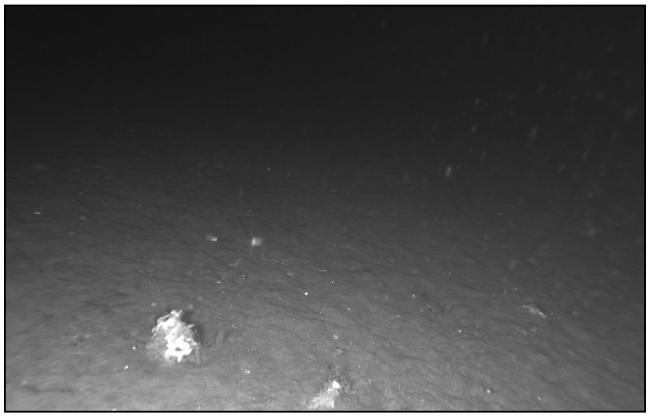






Images



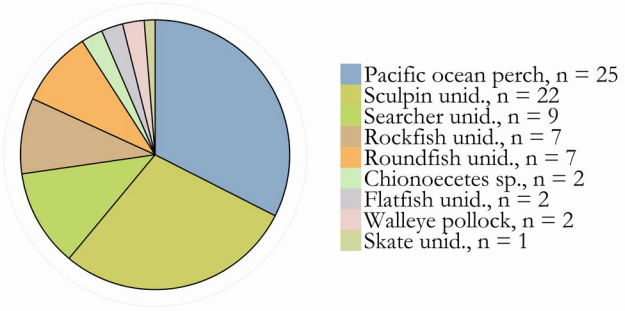


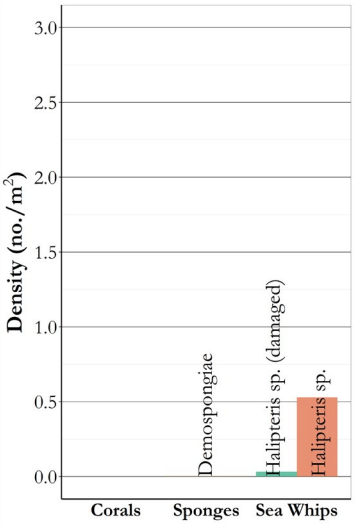
Summary - description of transect

Transect 169: Primary and secondary substrates consisted entirely of sand. Fish and crab density for this transect was 0.03 individuals/m^2, and 50% of individuals identified were sculpins. Vertical habitat consisted of 2 Demospongiae, averaging 14.7 cm height. No corals were identified.

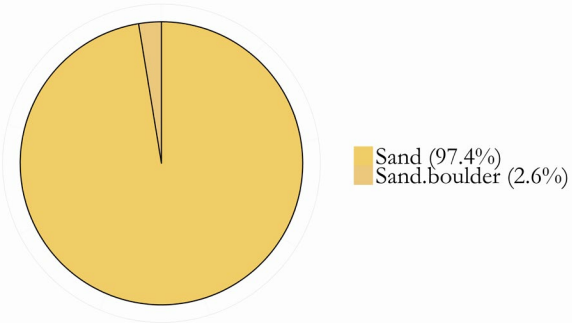
Area: Outer Shelf					Transect 183
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/28/14	58.43	-174.43	1,249	156	3.7

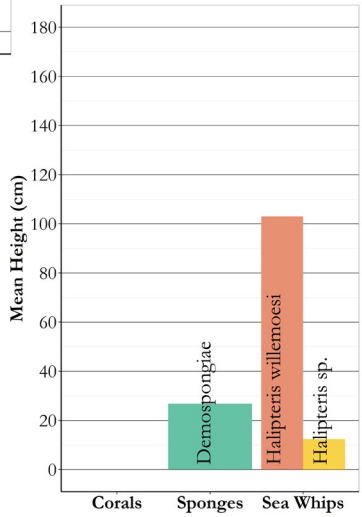
Fish and Crab Composition (n = 77)



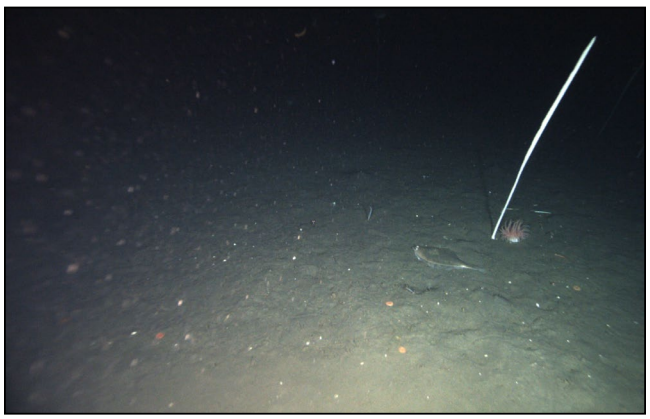


Substrate Composition





Images

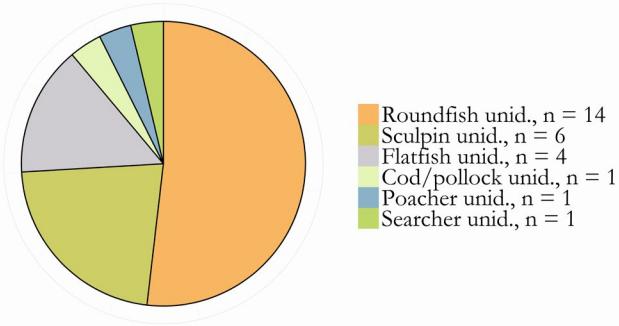


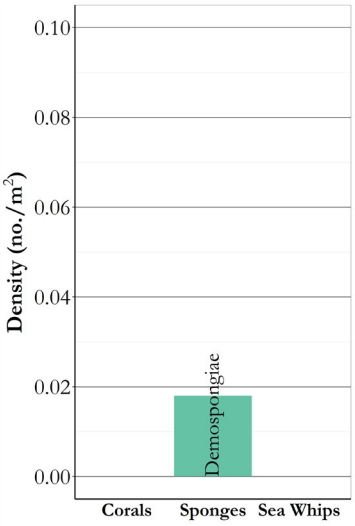
Summary - description of transect

Transect 183: Primary and secondary substrates consisted almost entirely of sand, with a small patch of boulders. Of the 77 individuals counted, 32% were Pacific ocean perch and 29% were sculpins. One skate and 2 crabs were also identified. Species density was 0.06 individuals/m^2. Vertical habitat consisted of 702 sea whips (41 damaged) and 5 Demospongiae. Sponge and sea whip density was 0.57 individuals/m^2. Mean height for 3 measured Demospongiae was 26.8 cm. Sea whips were spilt between *Halipteris* sp. and *Halipteris willemoesi*. Mean heights for 16 *Halipteris* sp. and 27 *Halipteris willemoesi* were 12.3 cm, and 103.0 cm, respectively. No other corals were identified.

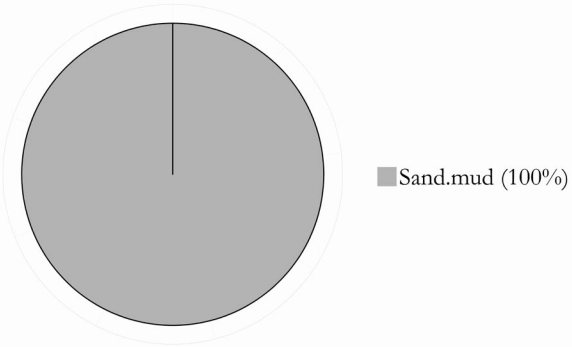
Area: Outer Shelf					Transect 185
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/28/14	58.64	-174.37	760	157	3.7

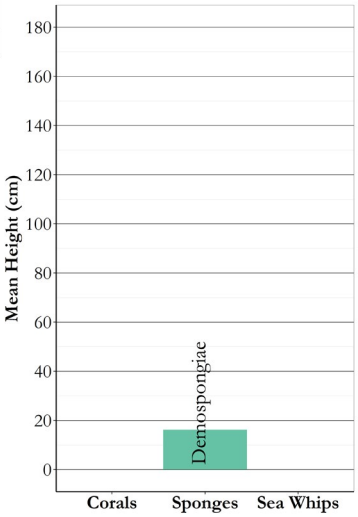
Fish and Crab Composition (n = 27)



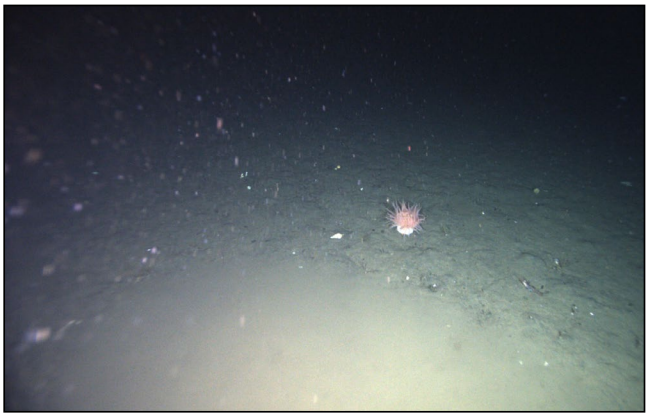


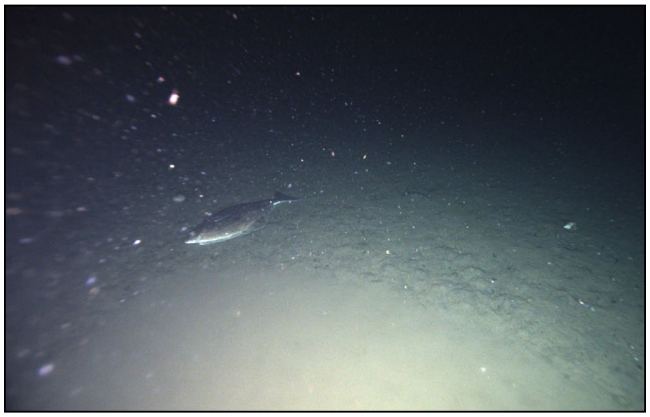
Substrate Composition





Images



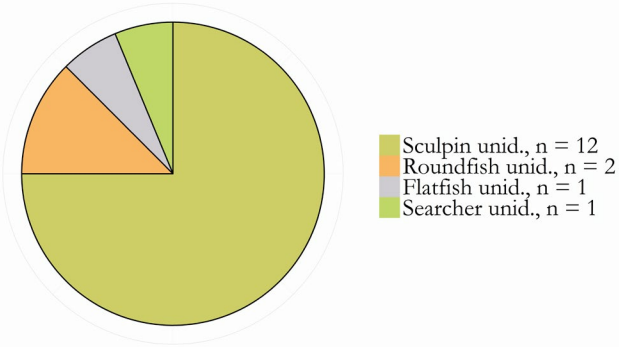


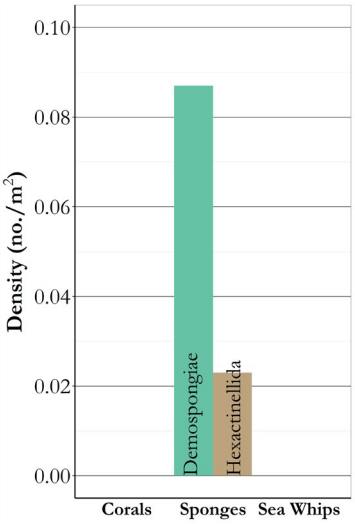
Summary - description of transect

Transect 185: Primary and secondary substrates consisted entirely of sand and mud. Of the 27 individuals counted, 52% were unidentified roundfishes, 22% were sculpins, and 15% were flatfishes. Species density was 0.04 individuals/m^2. Vertical habitat consisted of 14 Demospongiae, for a transect density of 0.02 individuals/m^2. Mean height of 3 measured Demospongiae was 16.2 cm. No corals were identified.

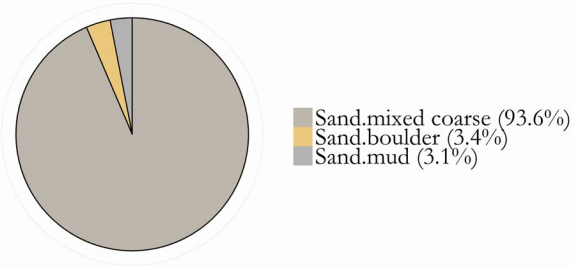
Area: Outer Shelf					Transect 186
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/28/14	58.66	-174.40	1,241	171	3.6

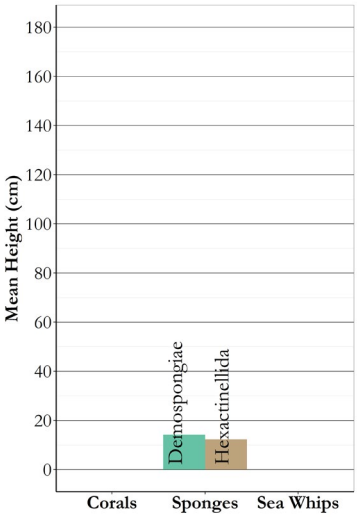
Fish and Crab Composition (n = 16)



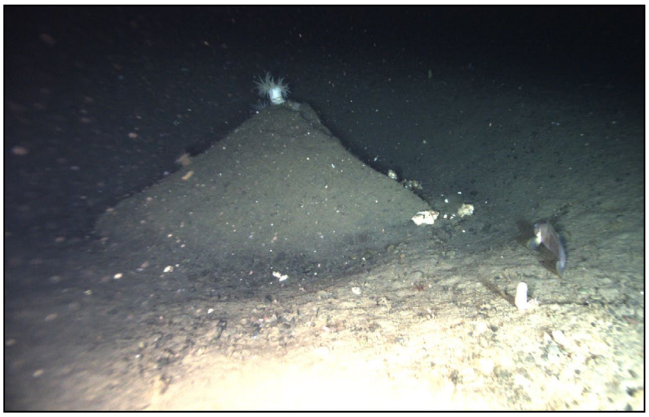


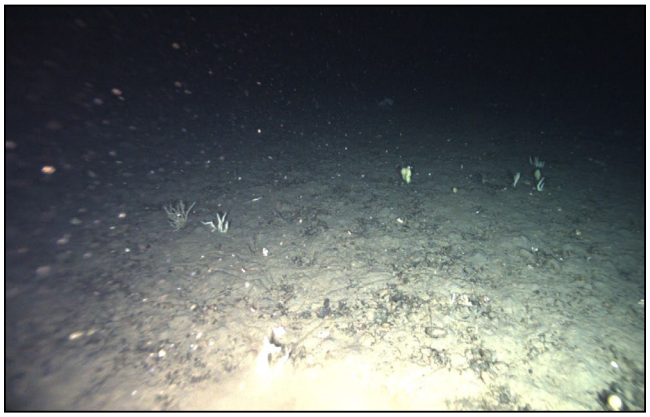
Substrate Composition





Images



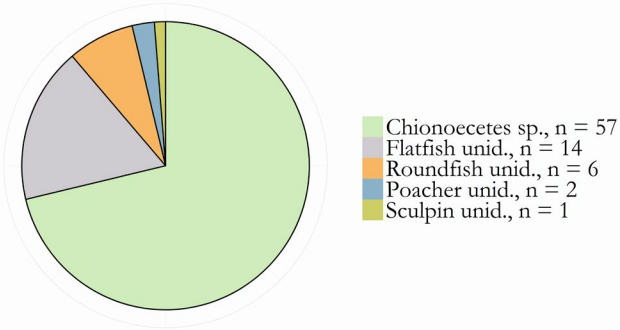


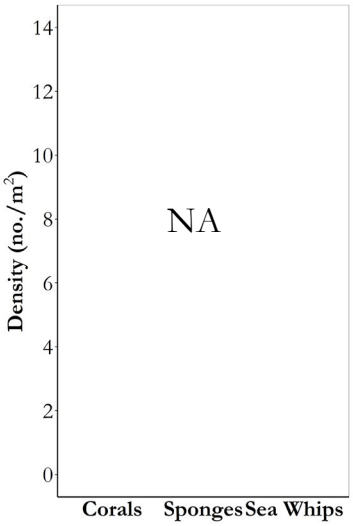
Summary - description of transect

Transect 186: Primary and secondary substrates consisted largely of sand and mud. Only 16 individuals were counted, and 75% were sculpins. Fish density was low (0.01 individuals/m^2). Vertical habitat consisted of 108 Demospongiae and 28 Hexactinellida. Sponge density was 0.11 individuals/m^2. Mean heights did not exceed 15 cm for either sponge type. No corals were identified.

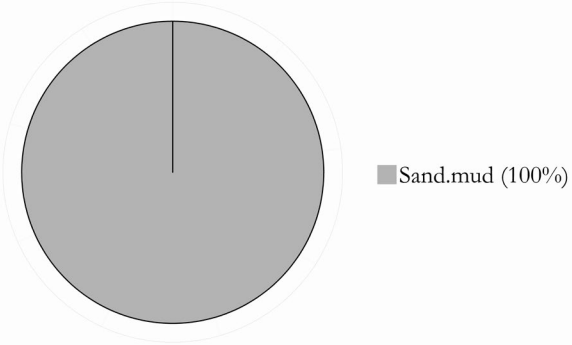
Area: Outer Shelf					Transect 187
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/28/14	58.74	-174.46	927	148	3.8

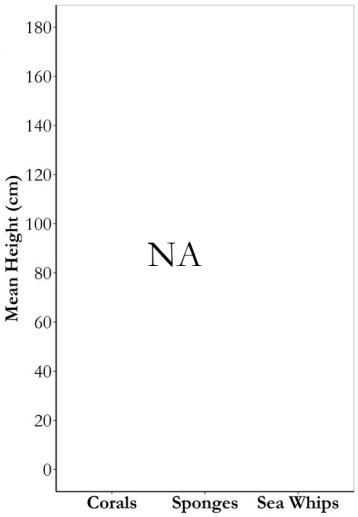
Fish and Crab Composition (n = 80)



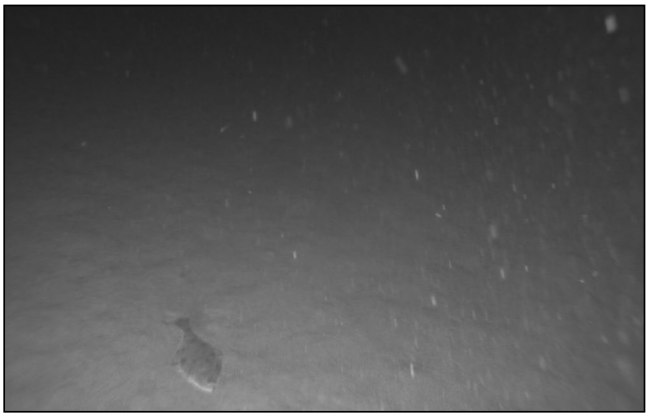


Substrate Composition





Images

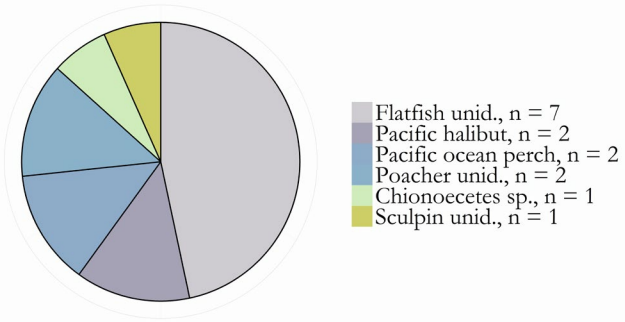


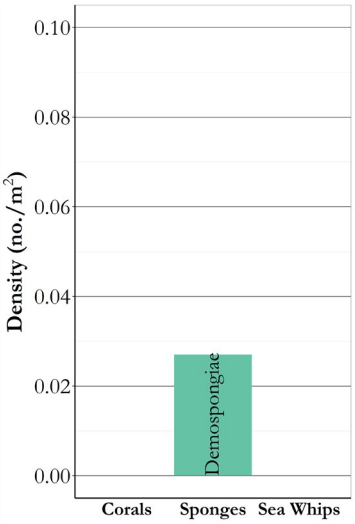
Summary - description of transect

Transect 187: Primary and secondary substrates consisted entirely of sand and mud. Of the 80 individuals counted, *Chionoecetes* sp., and flatfishes were the most abundant. Species density was 0.09 individuals/m^2. No vertical habitat was identified.

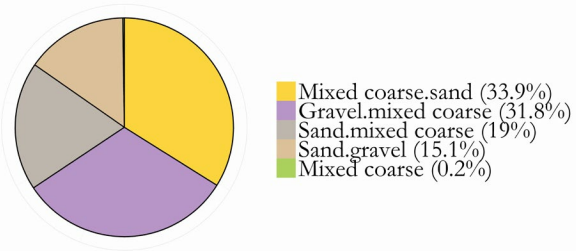
Area: Outer Shelf					Transect 188
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/28/14	58.64	-174.51	1,239	181	3.6

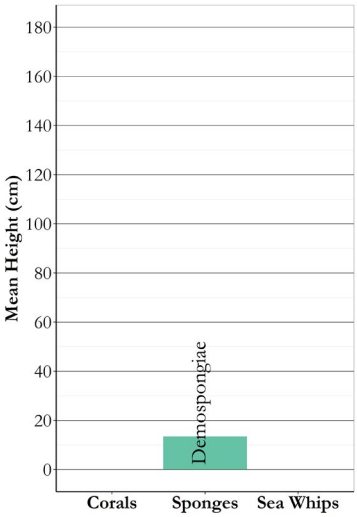
Fish and Crab Composition (n = 15)



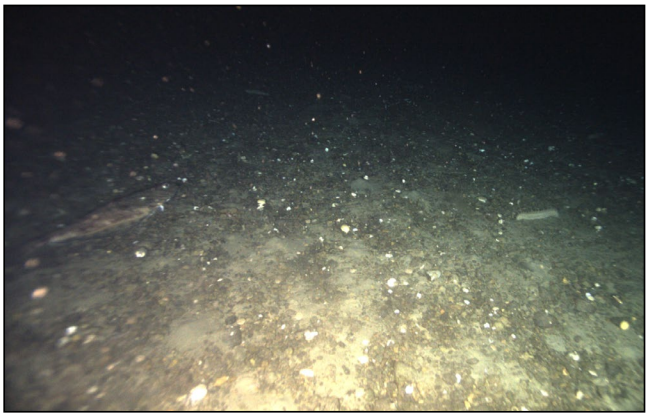


Substrate Composition





Images

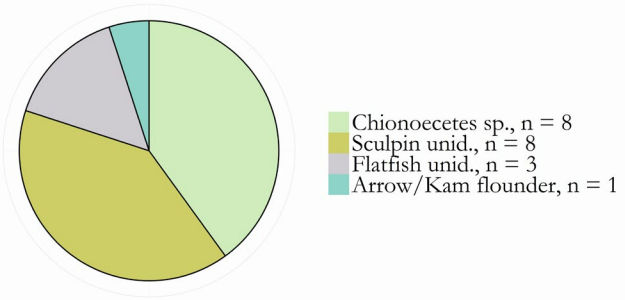


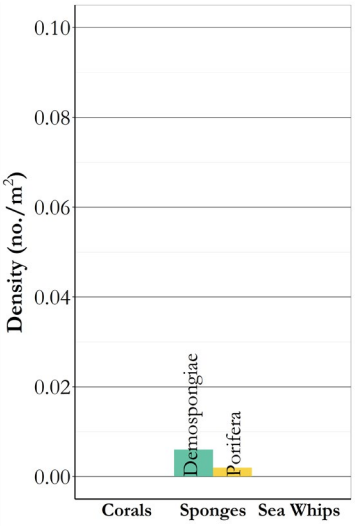
Summary - description of transect

Transect 188: Primary and secondary substrates were split between sand/mixed coarse, mixed coarse/sand, gravel/mixed coarse, and sand/gravel. Species density was 0.01 individuals/m^2, and 47% of the species counted were unidentified flatfishes. Vertical habitat consisted of 34 Demospongiae. Sponge density was 0.03 individuals/m^2, and the mean height of 10 Demospongiae was 13.5 cm. No corals were identified.

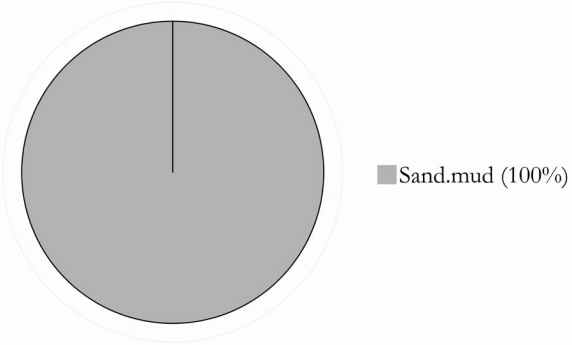
Area: Outer Shelf					Transect 204
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
8/30/14	59.07	-178.29	1,285	150	3.3

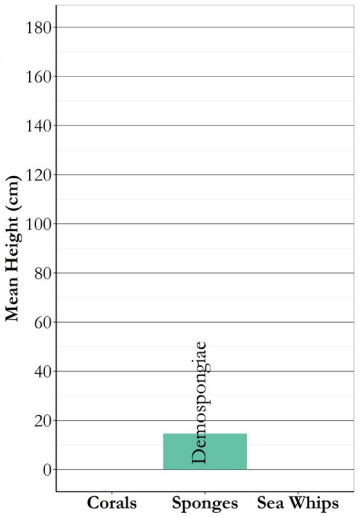
Fish and Crab Composition (n = 20)





Substrate Composition





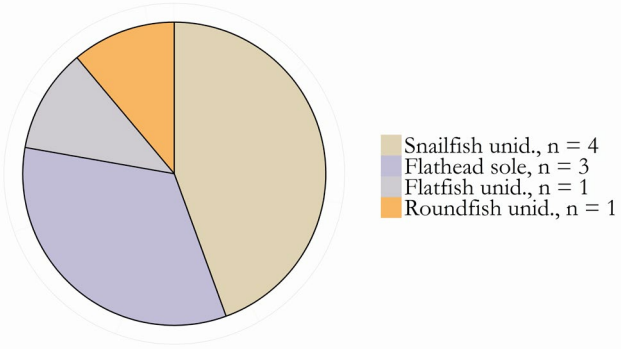
Images

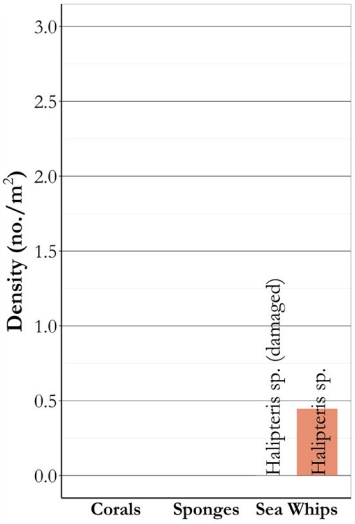
Summary - description of transect

Transect 204: Primary and secondary substrates consisted entirely of sand and mud. Only 20 individuals were identified, and *Chionoecetes* sp. and sculpins were the most abundant. Species density was 0.02 individuals/m^2. Vertical habitat consisted of 8 Demospongiae and 2 unidentified sponges. Sponge density was 0.01 individuals/m^2. One Demospongiae was measured (14.6 cm). No corals were identified.

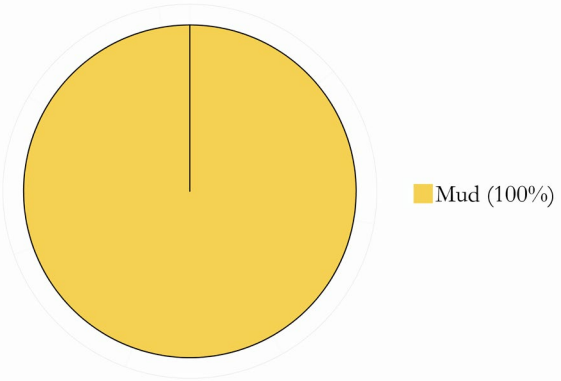
Area: Outer Shelf					Transect 239
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/4/14	55.15	-167.68	1,215	278	4.0

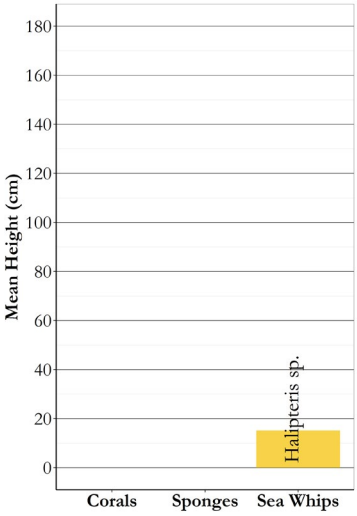
Fish and Crab Composition (n = 9)



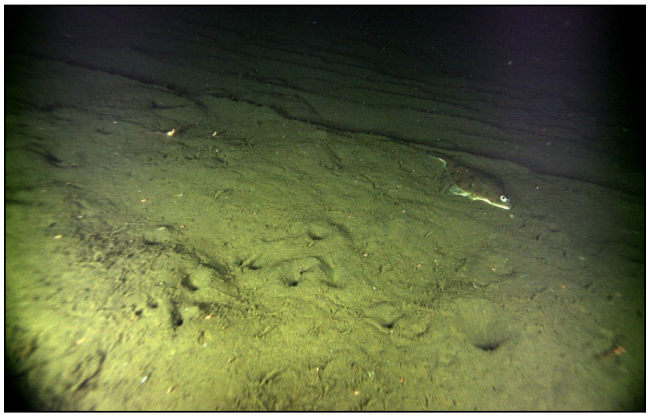


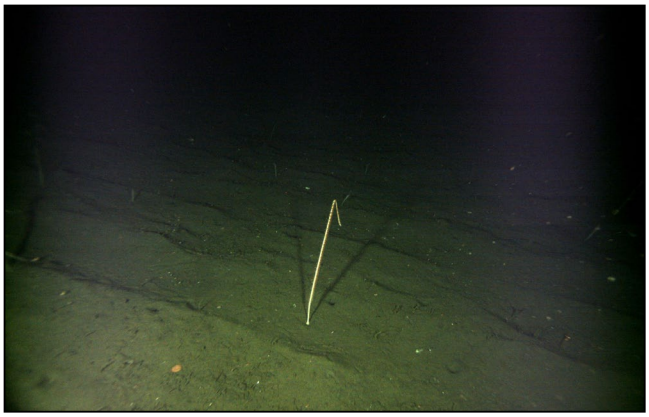
Substrate Composition





Images



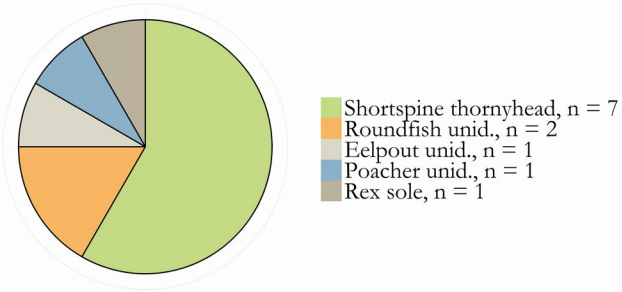


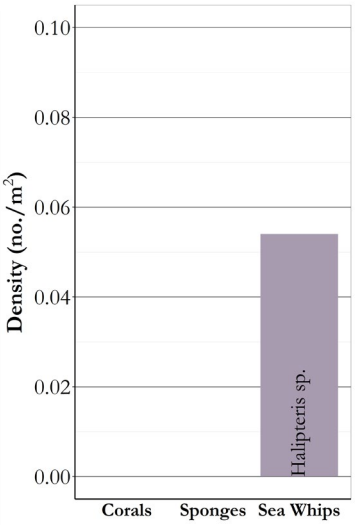
Summary - description of transect

Transect 239: Primary and secondary substrates consisted entirely of mud. Snailfishes and flatfishes comprised 88% of the species seen, and fish density for the entire transect was < 0.01 individuals/m^2. Sea whips were abundant (n = 543, 1 damaged) and transect density was 0.44 individuals/m^2. The sea whips were small with mean heights of 15.2 cm. No other corals or sponges were identified.

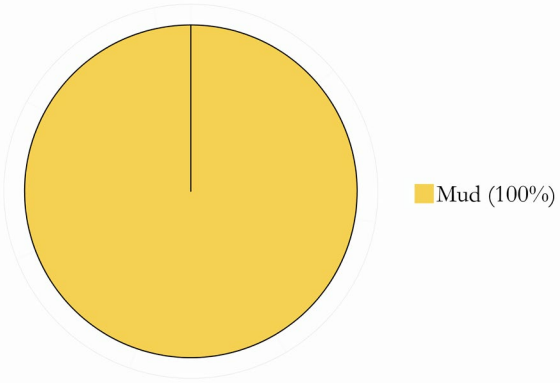
Area: Outer Shelf					Transect 242
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/4/14	54.91	-167.40	404	371	3.9

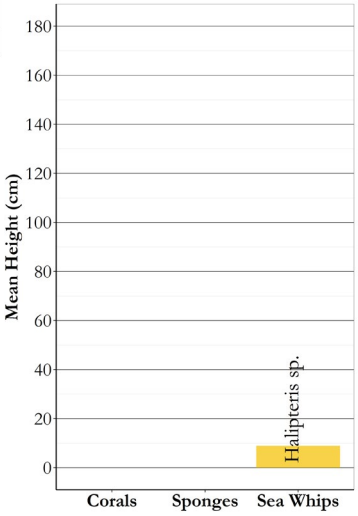
Fish and Crab Composition (n = 12)





Substrate Composition





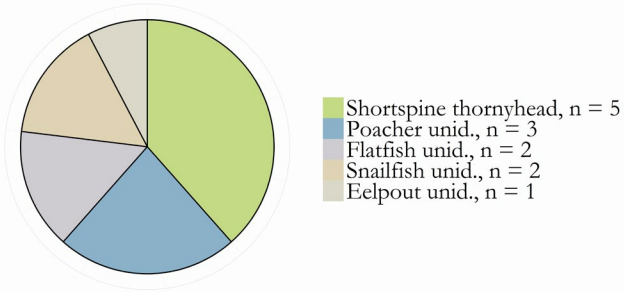
Images

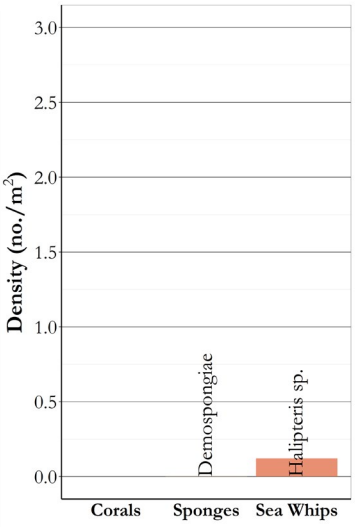
Summary - description of transect

Transect 242: Primary and secondary substrates consisted entirely of mud. Overall fish density for this transect was low (0.03 individuals/m^2). Shortspine thornyheads were the most abundant fish. Twenty-two sea whips (*Halipteris* sp.) were counted, and their mean height was 8.9 cm. No other corals or sponges were identified.

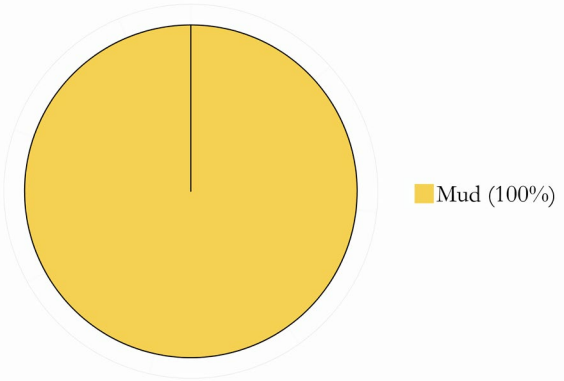
Area: Outer Shelf					Transect 244
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/4/14	54.86	-167.17	765	321	4.0

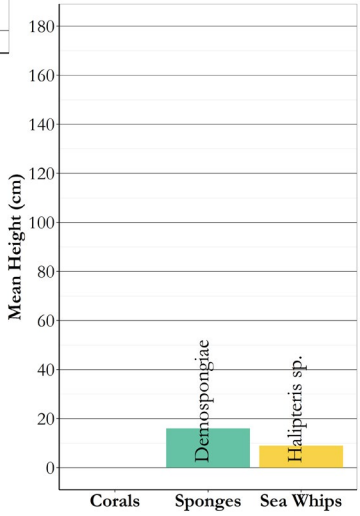
Fish and Crab Composition (n = 13)



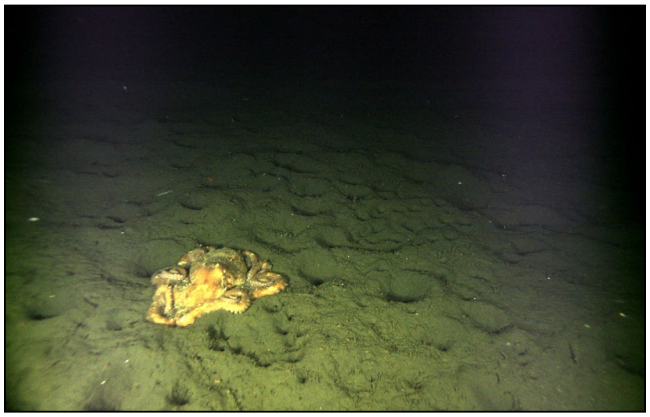


Substrate Composition





Images

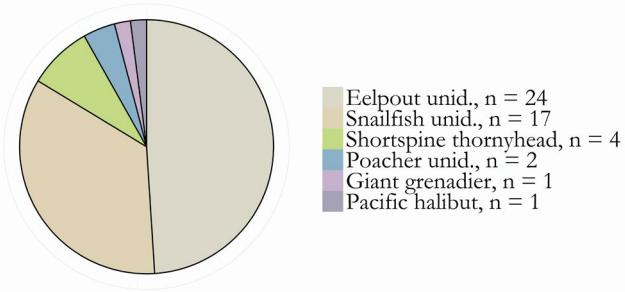


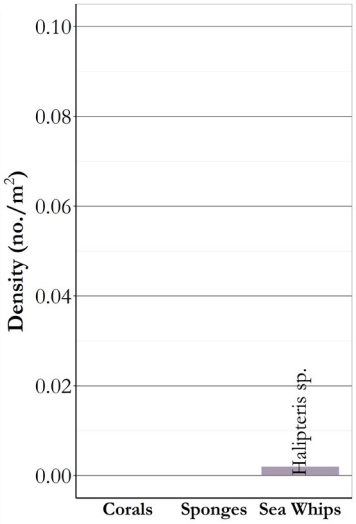
Summary - description of transect

Transect 244: Primary and secondary substrates consisted entirely of mud. Over half (61%) of the fishes identified were poachers and shortspine thornyheads. Total fish density was low (0.02 individuals/m^2). Vertical habitat consisted of 93 sea whips and 2 Demospongiae. Mean heights were 8.9 cm and 16 cm, respectively. Sponge and sea whip density was 0.12 individuals/m^2. No other corals were identified.

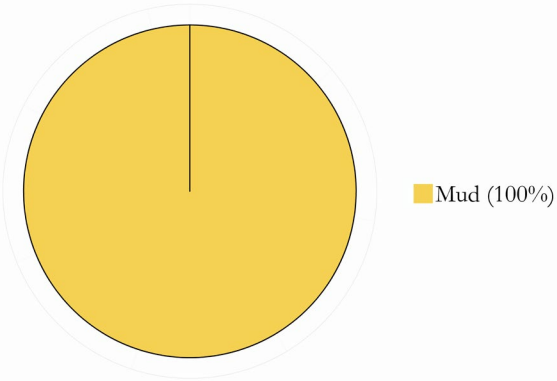
Area: Outer Shelf					Transect 245
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/4/14	54.66	-167.19	406	453	3.7

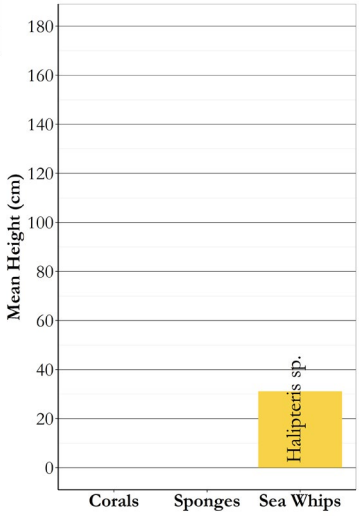
Fish and Crab Composition (n = 49)





Substrate Composition





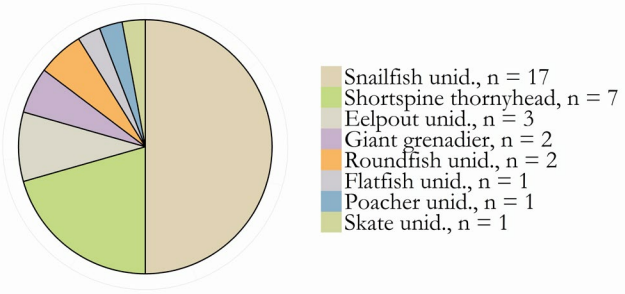
Images

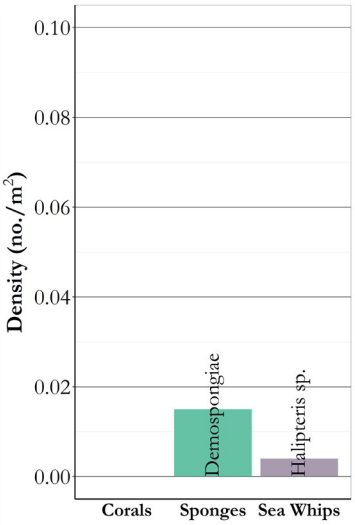
Summary - description of transect

Transect 245: Primary and secondary substrates consisted entirely of mud. Snailfish and eelpout frequencies accounted for 84% of the species identified. Fish density was 0.12 individuals/m^2. One sea whip was identified and measured (31.1 cm). No other corals or sponges were identified.

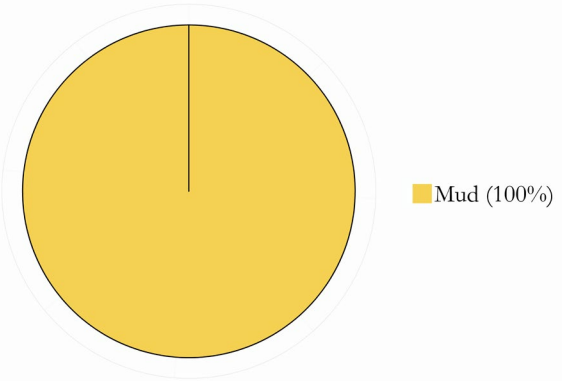
Area: Outer Shelf					Transect 246
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/4/14	54.58	-167.12	787	451	3.7

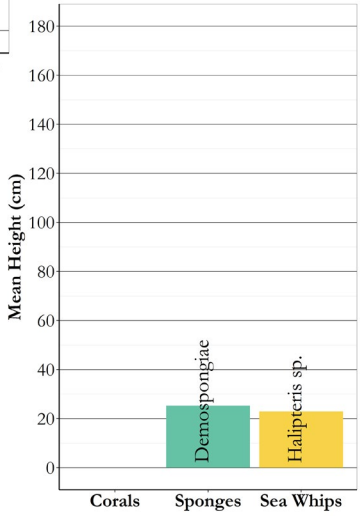
Fish and Crab Composition (n = 34)





Substrate Composition





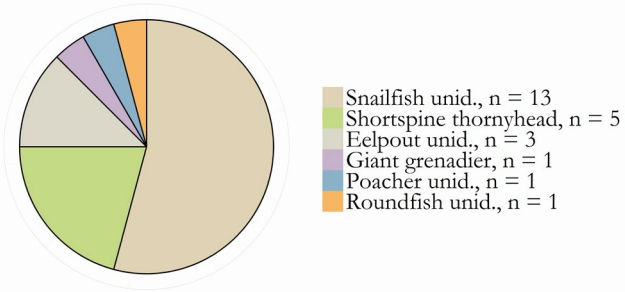
Images

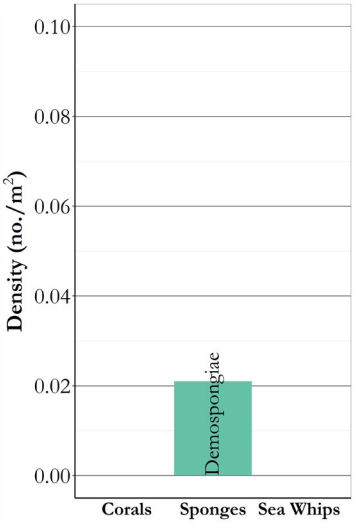
Summary - description of transect

Transect 246: Primary and secondary substrates consisted entirely of mud. Transect 246 had more diversity than many transects in this region (8 taxa), but a low density (0.04 individuals/m^2). Snailfishes and shortspine thornyheads accounted for 71% of the species seen. One skate was identified. Available vertical habitat was composed of 12 sponges and 3 sea whips reaching mean heights of approximately 24 cm. No other corals were identified.

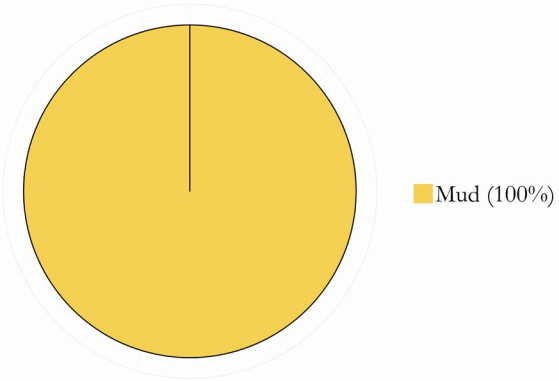
Area: Outer Shelf					Transect 251
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/5/14	54.44	-167.05	471	513	3.6

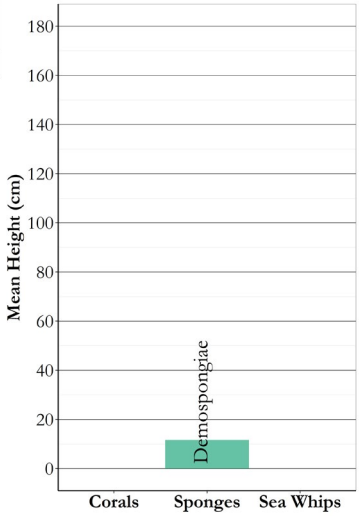
Fish and Crab Composition (n = 24)





Substrate Composition





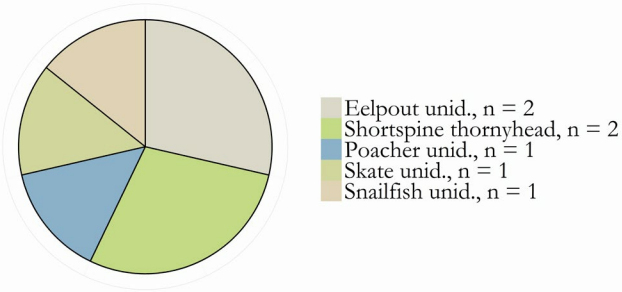
Images

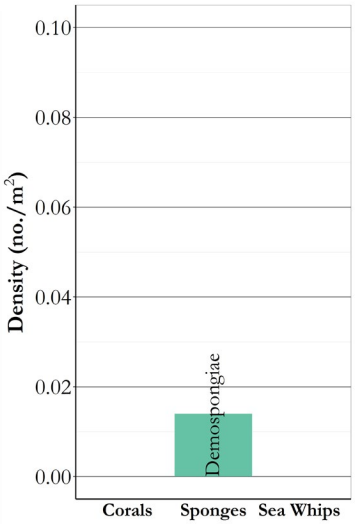
Summary - description of transect

Transect 251: Primary and secondary substrates consisted entirely of mud. Fish density for the transect was 0.05 individuals/m^2, and snailfishes were the most abundant taxa. Vertical habitat consisted of 10 Demospongiae, averaging 11.6 cm height. No corals were identified.

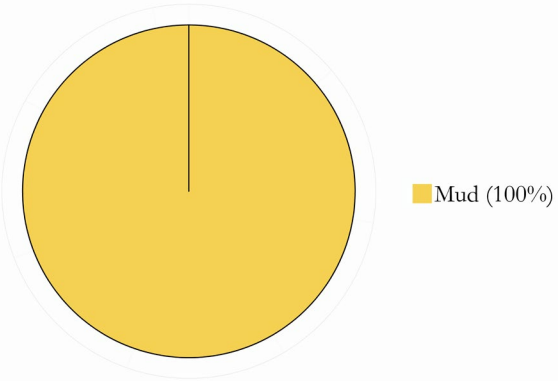
Area: Outer Shelf					Transect 252
Date (mm/dd/yy)	Start Position (DD)		Area (m^2)	Mean Depth (m)	Mean Temp (°C)
9/5/14	54.49	-167.02	356	472	3 7

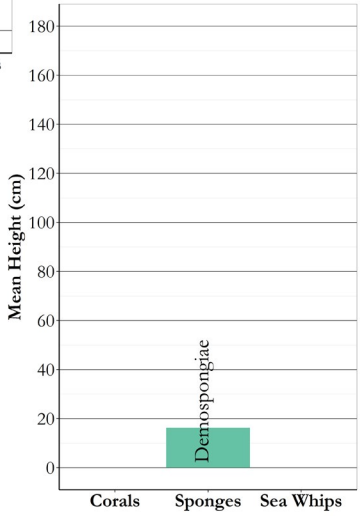
Fish and Crab Composition (n = 7)





Substrate Composition





Images

Summary - description of transect

Transect 252: Primary and secondary substrates consisted entirely of mud. Only seven fish were identified in this transect, resulting in a transect density of 0.02 individuals/m^2. Five Demospongiae were identified and 3 were measured (16.2 cm). No corals were identified.

Appendix Table A1. -- Eastern Bering Sea Canyons and Outer Shelf 2014 camera survey transect data.

Canyon/ Region	Transect #	Date (mm/dd/yy)	Start Lat.	Start Long.	Distance (m)	Swath (m)	Area (m^2)	Mean Depth (m)	Mean Temp. (°C)
Bering	1	NA	NA	NA	NA	NA	NA	NA	NA
Bering	2	8/11/2014	54.35	-167.06	239.8	2.9	702	691	NA
Bering	3	8/11/2014	54.41	-166.95	444.1	3.7	1,664	551	3.5
Bering	4	8/12/2014	54.42	-166.88	510.6	3.8	1,936	550	3.5
Bering	5	8/12/2014	54.43	-166.77	542.5	4.0	2,156	542	3.5
Outer Shelf	6	8/12/2014	54.53	-166.96	225.2	3.2	724	451	3.7
Outer Shelf	7	8/12/2014	55.77	-168.42	624.7	5.5	3,441	137	4.4
Outer Shelf	8	8/12/2014	55.73	-168.66	108.0	3.4	367	140	4.2
Outer Shelf	9	8/12/2014	55.72	-168.66	205.5	2.9	596	140	4.2
Outer Shelf	10	8/12/2014	55.72	-168.70	301.8	2.8	851	142	4.2
Bering to Pribilof	11	8/12/2014	55.72	-168.77	328.7	2.7	883	163	4.1
Outer Shelf	12	8/12/2014	55.77	-168.71	538.7	3.0	1,592	141	4.2
Outer Shelf	13	8/12/2014	55.78	-168.64	542.4	2.9	1,589	140	4.3
Bering to Pribilof	14	8/12/2014	55.81	-168.72	463.5	2.6	1,216	143	4.2
Bering to Pribilof	15	8/12/2014	55.82	-168.71	434.8	2.9	1,244	143	4.2
Bering to Pribilof	16	8/13/2014	55.83	-168.75	310.8	5.4	1,673	144	4.2
Outer Shelf	17	8/13/2014	55.84	-168.69	389.5	3.2	1,230	143	4.2
Outer Shelf	18	8/13/2014	55.86	-168.68	362.4	3.4	1,237	145	4.2
Outer Shelf	19	8/13/2014	55.89	-168.70	426.0	2.8	1,185	150	4.2
Outer Shelf	20	8/13/2014	55.86	-168.77	438.8	3.0	1,315	146	4.2
Bering to Pribilof	21	8/13/2014	55.88	-168.91	382.1	3.6	1,375	226	3.9
Outer Shelf	22	8/13/2014	55.89	-168.83	441.1	3.3	1,449	164	4.1
Outer Shelf	23	8/13/2014	55.89	-168.77	399.0	2.7	1,081	153	4.2
Bering to Pribilof	24	8/13/2014	55.86	-168.83	469.3	4.8	2,231	150	4.0
Outer Shelf	25	8/13/2014	55.88	-168.80	525.8	2.9	1,511	152	4.1
Pribilof	26	8/13/2014	55.92	-168.77	473.1	3.0	1,437	178	4.0
Pribilof	27	8/13/2014	56.07	-168.61	290.2	3.7	1,087	659	3.4
Pribilof	28	8/13/2014	56.08	-168.55	268.7	3.3	896	529	3.7
Pribilof	29	8/14/2014	56.10	-168.61	240.5	3.3	799	524	3.7
Pribilof	30	8/14/2014	56.15	-168.63	459.5	4.0	1,829	394	3.8
Pribilof	31	8/14/2014	56.17	-168.74	499.6	5.4	2,713	327	3.9
Outer Shelf	32	8/14/2014	56.02	-168.06	384.2	3.1	1,205	139	4.3
Outer Shelf	33	8/14/2014	56.11	-168.20	568.2	2.3	1,309	149	4.3
Outer Shelf	34	8/14/2014	56.15	-168.12	662.9	3.3	2,179	143	4.3
Outer Shelf	35	8/14/2014	56.14	-168.18	241.5	3.3	800	147	4.3
Pribilof	36	8/14/2014	56.10	-168.46	182.4	3.4	621	309	3.9
Outer Shelf	37	8/14/2014	56.15	-168.49	466.1	3.0	1,421	252	3.9
Outer Shelf	38	8/14/2014	56.19	-168.52	403.5	2.9	1,166	206	4.1
Outer Shelf	39	8/14/2014	56.23	-168.44	448.0	3.3	1,496	174	4.3

Appendix Table A1. -- Continued.

Canyon/ Region	Transect #	Date (mm/dd/yy)	Start Lat.	Start Long.	Distance (m)	Swath (m)	Area (m^2)	Mean Depth (m)	Mean Temp. (°C)
Outer Shelf	40	8/14/2014	56.21	-168.62	542.9	3.4	1,859	212	4.0
Pribilof	41	8/15/2014	56.19	-168.81	499.4	3.0	1,512	215	4.0
Pribilof	42	8/15/2014	56.14	-168.79	361.2	3.6	1,298	532	3.6
Pribilof	43	8/15/2014	56.08	-168.82	211.6	2.8	598	714	3.4
Outer Shelf	44	8/15/2014	56.49	-168.65	491.7	3.2	1,598	110	4.0
Outer Shelf	45	8/15/2014	56.46	-168.70	466.4	3.0	1,408	112	4.1
Outer Shelf	46	8/15/2014	56.31	-169.03	562.4	2.6	1,477	136	4.4
Outer Shelf	47	8/15/2014	56.27	-169.09	536.3	2.5	1,353	141	4.3
Pribilof	48	8/15/2014	56.18	-169.14	339.9	2.7	901	550	3.7
Pribilof	49	8/15/2014	56.22	-169.22	384.0	2.7	1,051	279	3.9
Pribilof	50	8/15/2014	56.19	-169.32	435.7	3.0	1,308	533	3.5
Pribilof	51	8/15/2014	56.20	-169.36	605.5	2.6	1,550	520	3.6
Pribilof	52	8/16/2014	56.21	-169.38	565.9	2.6	1,473	498	3.6
Pribilof	53	8/16/2014	56.22	-169.38	839.3	3.6	3,016	446	3.7
Pribilof	54	8/16/2014	56.23	-169.43	774.1	4.4	3,371	435	3.7
Pribilof	55	8/16/2014	56.21	-169.44	575.9	2.8	1,620	502	3.6
Outer Shelf	56	8/16/2014	56.44	-169.81	301.2	2.4	711	91	4.4
Outer Shelf	57	8/16/2014	56.43	-169.80	405.1	2.6	1,055	92	4.4
Pribilof	58	8/16/2014	56.42	-169.84	383.9	2.6	980	93	4.5
Pribilof	59	8/16/2014	56.35	-169.97	194.4	2.7	534	105	4.5
Pribilof	60	8/16/2014	56.36	-169.86	290.0	2.9	833	105	4.5
Pribilof	61	8/16/2014	56.36	-169.76	467.6	3.4	1,611	115	4.5
Pribilof	62	8/16/2014	56.31	-169.79	424.2	4.0	1,679	126	4.4
Pribilof	63	8/16/2014	56.31	-169.70	236.1	4.7	1,110	188	4.0
Outer Shelf	64	8/16/2014	56.31	-169.58	372.3	2.8	1,039	158	NA
Pribilof	65	8/16/2014	56.30	-169.45	612.3	3.4	2,080	181	4.2
Pribilof	66	8/17/2014	56.28	-169.60	445.6	3.5	1,559	201	4.2
Pribilof	67	8/17/2014	56.26	-169.72	598.3	3.7	2,243	261	3.9
Pribilof	68	8/17/2014	56.22	-169.75	589.6	3.9	2,328	261	4.1
Pribilof	69	8/17/2014	56.17	-169.69	102.9	4.3	445	314	3.8
Pribilof	70	8/17/2014	56.18	-169.58	513.0	2.2	1,105	399	3.7
Pribilof	71	8/17/2014	56.15	-169.36	280.1	2.0	561	760	3.3
Pribilof	72	8/17/2014	56.15	-169.36	248.6	2.3	581	761	3.3
Pribilof	73	8/17/2014	56.09	-169.36	582.6	2.5	1,433	349	3.8
Pribilof	74	8/17/2014	56.07	-169.45	387.0	1.8	693	264	3.8
Pribilof to Zhemchug	75	8/17/2014	56.02	-169.40	436.8	2.8	1,216	721	3.2
Pribilof to Zhemchug	76	8/17/2014	55.99	-169.63	326.2	2.4	772	474	3.7
Pribilof to Zhemchug	77	8/17/2014	55.99	-169.68	466.1	2.6	1,213	583	3.4

Appendix Table A1. -- Continued.

Canyon/ Region	Transect #	Date (mm/dd/yy)	Start Lat.	Start Long.	Distance (m)	Swath (m)	Area (m^2)	Mean Depth (m)	Mean Temp. (°C)
Pribilof to Zhemchug	78	8/17/2014	55.98	-169.69	372.7	2.3	848	647	3.3
Outer Shelf	79	8/18/2014	56.17	-170.00	226.9	2.2	492	117	4.5
Outer Shelf	80	8/18/2014	56.15	-170.07	274.5	2.1	582	117	4.4
Outer Shelf	81	8/18/2014	56.13	-170.00	442.7	2.2	975	120	4.4
Outer Shelf	82	8/18/2014	56.10	-169.95	360.0	3.1	1,115	123	NA
Outer Shelf	83	8/18/2014	56.03	-169.89	373.0	1.8	653	131	4.3
Pribilof to Zhemchug	84	8/18/2014	56.00	-169.93	497.8	2.5	1,231	218	3.9
Pribilof to Zhemchug	85	8/18/2014	56.01	-170.00	432.8	3.2	1,387	141	4.0
Outer Shelf	86	8/18/2014	56.05	-170.05	268.8	2.1	552	128	4.3
Pribilof to Zhemchug	87	8/18/2014	56.00	-170.06	730.2	2.5	1,814	167	4.1
Pribilof to Zhemchug	88	8/18/2014	55.97	-170.12	511.2	3.2	1,621	311	3.9
Pribilof to Zhemchug	89	8/18/2014	56.01	-170.28	421.9	2.9	1,210	340	3.8
Pribilof to Zhemchug	90	8/18/2014	56.06	-170.32	27.3	3.1	84	420	3.8
Outer Shelf	91	8/18/2014	56.08	-170.29	313.2	2.0	639	135	4.3
Outer Shelf	92	8/18/2014	56.18	-170.26	363.2	3.2	1,174	118	4.4
Pribilof to Zhemchug	93	8/19/2014	56.10	-170.45	378.4	2.7	1,018	177	4.4
Pribilof to Zhemchug	94	8/19/2014	56.10	-170.46	237.8	3.0	712	188	4.4
Pribilof to Zhemchug	95	8/19/2014	56.10	-170.57	276.9	2.6	722	523	3.7
Pribilof to Zhemchug	96	8/19/2014	56.13	-170.66	216.0	3.1	667	759	3.3
Pribilof to Zhemchug	97	8/19/2014	56.11	-170.77	466.4	3.2	1,509	455	3.8
Pribilof to Zhemchug	98	8/19/2014	56.13	-170.84	425.9	2.2	930	629	3.6
Pribilof to Zhemchug	99	8/19/2014	56.14	-170.76	277.7	1.8	512	357	3.9
Pribilof to Zhemchug	100	8/19/2014	56.16	-170.78	244.3	1.8	431	148	4.3
Outer Shelf	101	8/19/2014	56.22	-170.68	299.7	2.4	710	127	4.3
Pribilof to Zhemchug	102	8/19/2014	56.20	-170.88	249.5	2.0	491	142	4.3
Pribilof to Zhemchug	103	8/19/2014	56.24	-170.85	398.9	1.9	750	132	4.5
Outer Shelf	104	8/19/2014	56.40	-170.89	353.2	2.7	970	122	4.3
Outer Shelf	105	8/19/2014	56.39	-170.67	600.6	2.2	1,335	116	4.5

Appendix Table A1. -- Continued.

Canyon/ Region	Transect #	Date (mm/dd/yy)	Start Lat.	Start Long.	Distance (m)	Swath (m)	Area (m^2)	Mean Depth (m)	Mean Temp. (°C)
Pribilof to Zhemchug	106	8/20/2014	56.28	-170.89	391.3	2.9	1,145	130	NA
Pribilof to Zhemchug	107	8/20/2014	56.26	-170.96	389.7	1.8	714	137	4.4
Pribilof to Zhemchug	108	8/20/2014	56.29	-171.00	496.2	2.4	1,193	131	4.4
Outer Shelf	109	8/20/2014	56.32	-171.09	254.1	2.5	627	133	4.4
Outer Shelf	110	8/20/2014	56.34	-171.13	385.4	3.4	1,298	133	4.3
Pribilof to Zhemchug	111	8/20/2014	56.29	-171.10	240.7	1.9	451	134	4.3
Pribilof to Zhemchug	112	8/20/2014	56.27	-171.13	127.9	1.6	204	138	4.3
Pribilof to Zhemchug	113	8/20/2014	56.23	-171.31	84.9	2.5	214	726	3.4
Pribilof to Zhemchug	114	8/20/2014	56.26	-171.33	614.4	3.1	1,918	238	3.9
Pribilof to Zhemchug	115	8/20/2014	56.40	-171.37	664.3	2.3	1,549	210	4.1
Pribilof to Zhemchug	116	8/20/2014	56.42	-171.38	748.9	2.6	1,957	207	4.1
Pribilof to Zhemchug	117	8/20/2014	56.47	-171.49	554.6	2.7	1,519	285	3.9
Pribilof to Zhemchug	118	8/20/2014	56.47	-171.74	370.2	2.2	806	281	3.9
Pribilof to Zhemchug	119	8/20/2014	56.45	-171.85	346.5	3.6	1,235	760	3.3
Pribilof to Zhemchug	120	8/21/2014	56.54	-172.12	451.4	2.2	1,000	537	3.7
Pribilof to Zhemchug	121	8/21/2014	56.58	-172.24	579.2	2.3	1,308	370	3.9
Pribilof to Zhemchug	122	8/21/2014	56.59	-172.36	376.5	2.6	982	434	3.8
Pribilof to Zhemchug	123	8/21/2014	56.65	-172.43	533.1	4.0	2,124	139	4.3
Pribilof to Zhemchug	124	8/21/2014	56.59	-172.52	545.8	4.0	2,201	214	4.0
Pribilof to Zhemchug	125	8/21/2014	56.51	-172.72	477.5	2.8	1,337	356	3.9
Pribilof to Zhemchug	126	8/21/2014	56.45	-172.72	99.4	4.8	474	757	3.2
Pribilof to Zhemchug	127	8/21/2014	56.48	-172.71	337.0	2.6	874	557	NA
Pribilof to Zhemchug	128	8/22/2014	56.46	-172.67	301.8	3.6	1,090	662	3.3
Pribilof to Zhemchug	129	8/22/2014	56.46	-172.75	287.7	3.2	915	713	3.3

Appendix Table A1. -- Continued.

Canyon/ Region	Transect #	Date (mm/dd/yy)	Start Lat.	Start Long.	Distance (m)	Swath (m)	Area (m^2)	Mean Depth (m)	Mean Temp. (°C)
Pribilof to Zhemchug	130	8/22/2014	56.50	-172.74	448.9	2.9	1,289	431	3.8
Pribilof to Zhemchug	131	8/22/2014	56.54	-172.79	537.7	3.7	2,009	306	3.9
Pribilof to Zhemchug	132	8/22/2014	56.56	-172.73	66.4	2.9	195	168	4.0
Pribilof to Zhemchug	133	8/22/2014	56.63	-172.95	349.8	4.2	1,477	142	4.3
Pribilof to Zhemchug	134	8/22/2014	56.66	-173.07	439.7	3.4	1,499	142	4.0
Pribilof to Zhemchug	135	8/22/2014	56.66	-173.14	496.3	3.6	1,790	214	3.9
Outer Shelf	136	8/22/2014	56.76	-173.17	452.2	2.2	1,004	135	4.2
Pribilof to Zhemchug	137	8/22/2014	56.75	-173.23	357.9	2.5	880	138	4.2
Pribilof to Zhemchug	138	8/22/2014	56.84	-173.33	372.0	2.5	926	163	4.2
Pribilof to Zhemchug	139	8/22/2014	56.88	-173.41	360.0	2.8	1,004	515	3.7
Pribilof to Zhemchug	140	8/22/2014	56.89	-173.38	359.4	3.7	1,338	273	4.0
Pribilof to Zhemchug	141	8/23/2014	56.94	-173.67	310.6	3.2	1,005	770	3.1
Pribilof to Zhemchug	142	8/23/2014	56.95	-173.43	283.5	3.6	1,025	519	3.6
Outer Shelf	143	8/24/2014	56.39	-170.40	312.5	2.8	865	112	4.4
Outer Shelf	144	8/24/2014	56.41	-170.40	337.9	2.2	755	111	4.5
Outer Shelf	145	8/24/2014	56.40	-170.43	392.2	3.3	1,281	110	4.4
Outer Shelf	146	8/24/2014	56.90	-172.23	352.7	3.6	1,264	120	4.3
Outer Shelf	147	8/25/2014	56.93	-172.23	416.2	3.5	1,442	119	4.3
Zhemchug	148	8/25/2014	57.75	-174.11	119.3	3.1	375	129	4.1
Zhemchug	149	8/25/2014	57.69	-174.05	335.9	4.1	1,392	121	3.9
Outer Shelf	150	8/25/2014	57.68	-174.00	435.5	3.9	1,679	125	4.0
Pribilof to Zhemchug	151	8/25/2014	57.67	-174.13	332.0	4.0	1,312	136	4.0
Outer Shelf	152	8/25/2014	57.66	-174.09	344.2	4.0	1,383	133	4.1
Outer Shelf	153	8/25/2014	57.64	-174.08	418.4	4.0	1,665	133	4.1
Pribilof to Zhemchug	154	8/25/2014	57.59	-174.00	383.4	4.3	1,630	132	4.1
Pribilof to Zhemchug	155	8/25/2014	57.57	-173.98	460.2	3.8	1,752	134	4.1
Pribilof to Zhemchug	156	8/25/2014	57.57	-174.04	417.0	3.3	1,375	141	4.1
Pribilof to Zhemchug	157	8/25/2014	57.58	-173.99	282.8	4.7	1,322	133	4.1

Appendix Table A1. -- Continued.

Canyon/ Region	Transect #	Date (mm/dd/yy)	Start Lat.	Start Long.	Distance (m)	Swath (m)	Area (m^2)	Mean Depth (m)	Mean Temp. (°C)
Pribilof to Zhemchug	158	8/25/2014	57.50	-174.00	148.2	3.2	469	796	3.2
Outer Shelf	159	8/26/2014	57.64	-173.81	188.7	5.4	1,010	129	4.1
Outer Shelf	160	8/26/2014	57.41	-173.52	481.5	3.6	1,721	121	4.2
Pribilof to Zhemchug	161	8/26/2014	57.00	-173.50	370.0	3.7	1,380	695	3.3
Pribilof to Zhemchug	162	8/26/2014	57.03	-173.82	458.0	2.6	1,211	573	3.5
Pribilof to Zhemchug	163	8/26/2014	56.99	-173.92	341.4	3.8	1,293	777	3.2
Pribilof to Zhemchug	164	8/26/2014	57.11	-173.96	218.3	3.1	681	766	3.2
Pribilof to Zhemchug	165	8/26/2014	57.24	-173.94	215.0	3.2	686	491	3.7
Pribilof to Zhemchug	166	8/26/2014	57.26	-173.98	150.9	3.1	464	719	3.2
Pribilof to Zhemchug	167	8/27/2014	57.28	-173.88	212.2	2.7	583	367	3.8
Pribilof to Zhemchug	168	8/27/2014	57.28	-173.93	298.0	2.6	772	591	3.5
Outer Shelf	169	8/27/2014	57.63	-173.74	215.2	2.3	496	125	4.1
Zhemchug	170	8/27/2014	57.67	-173.78	188.1	2.3	436	130	3.7
Zhemchug	171	8/27/2014	57.69	-173.88	182.0	4.0	727	122	4.0
Zhemchug	172	8/27/2014	57.76	-173.76	223.1	3.6	794	402	3.8
Zhemchug	173	8/27/2014	57.76	-173.85	298.8	2.3	684	485	3.7
Zhemchug	174	8/27/2014	57.85	-173.85	257.2	3.7	964	272	3.8
Zhemchug	175	8/27/2014	57.95	-173.89	215.6	3.0	655	241	3.7
Zhemchug	176	8/27/2014	57.96	-173.92	179.4	3.2	577	363	3.8
Zhemchug	177	8/27/2014	58.01	-174.02	241.2	2.8	685	422	3.8
Zhemchug	178	8/27/2014	58.07	-174.14	228.8	3.9	900	677	3.3
Zhemchug	179	8/28/2014	58.11	-174.17	230.9	3.7	846	563	3.6
Zhemchug	180	8/28/2014	58.20	-174.23	380.7	3.2	1,218	427	3.8
Zhemchug	181	8/28/2014	58.31	-174.35	382.6	3.0	1,149	347	3.9
Zhemchug	182	8/28/2014	58.33	-174.40	336.6	2.9	987	582	3.5
Outer Shelf	183	8/28/2014	58.43	-174.43	252.2	5.0	1,249	156	3.7
Zhemchug	184	8/28/2014	58.45	-174.50	119.4	2.6	307	153	3.8
Outer Shelf	185	8/28/2014	58.64	-174.37	285.9	2.7	760	157	3.7
Outer Shelf	186	8/28/2014	58.66	-174.40	353.7	3.5	1,241	171	3.6
Outer Shelf	187	8/28/2014	58.74	-174.46	321.4	2.9	927	148	3.8
Outer Shelf	188	8/28/2014	58.64	-174.51	395.7	3.1	1,239	181	3.6
Zhemchug	189	8/28/2014	58.62	-174.58	238.6	2.5	596	236	3.6
Zhemchug	190	8/28/2014	58.63	-174.61	420.3	2.6	1,109	251	3.7
Zhemchug	191	8/29/2014	58.57	-174.71	282.5	4.2	1,194	701	3.2

Appendix Table A1. -- Continued.

Canyon/ Region	Transect #	Date (mm/dd/yy)	Start Lat.	Start Long.	Distance (m)	Swath (m)	Area (m^2)	Mean Depth (m)	Mean Temp. (°C)
Zhemchug	192	8/29/2014	58.56	-174.79	291.3	3.5	1,031	737	3.3
Zhemchug	193	8/29/2014	58.56	-174.82	268.8	2.5	679	744	3.3
Zhemchug	194	8/29/2014	58.64	-175.00	363.8	2.7	970	288	3.8
Zhemchug	195	8/29/2014	58.49	-175.15	253.7	3.1	785	659	3.4
Zhemchug	196	8/29/2014	58.36	-175.09	426.8	3.0	1,281	479	3.7
Zhemchug	197	8/29/2014	58.32	-175.15	485.6	3.4	1,645	468	3.7
Zhemchug -Pervenets	198	8/29/2014	58.32	-175.26	401.6	3.5	1,390	385	3.9
Zhemchug -Pervenets	199	8/29/2014	58.32	-175.28	370.8	2.8	1,047	372	3.9
Zhemchug -Pervenets	200	8/29/2014	58.32	-175.34	316.0	2.7	849	375	3.8
Zhemchug -Pervenets	201	8/29/2014	58.24	-175.34	284.2	4.6	1,311	770	3.2
Zhemchug -Pervenets	202	8/30/2014	58.24	-175.53	496.9	4.3	2,141	710	3.3
Zhemchug -Pervenets	203	8/30/2014	58.40	-175.60	754.4	2.9	2,220	328	3.9
Outer Shelf	204	8/30/2014	59.07	-178.29	474.1	2.7	1,285	150	3.3
Zhemchug -Pervenets	205	8/30/2014	59.06	-178.33	457.3	3.4	1,565	247	3.8
Zhemchug -Pervenets	206	8/30/2014	59.07	-178.39	352.3	3.7	1,288	571	3.7
Zhemchug -Pervenets	207	8/30/2014	59.06	-178.45	375.5	3.7	1,395	761	3.3
Zhemchug -Pervenets	208	8/30/2014	59.10	-178.41	410.4	3.0	1,242	371	3.9
Zhemchug -Pervenets	209	8/30/2014	59.11	-178.42	311.4	3.2	983	412	3.8
Zhemchug -Pervenets	210	8/30/2014	59.13	-178.48	328.4	3.8	1,241	723	3.4
Zhemchug -Pervenets	211	8/30/2014	59.18	-178.46	307.5	2.8	865	359	3.9
Zhemchug -Pervenets	212	8/30/2014	59.19	-178.41	310.4	2.9	912	215	3.7
Zhemchug -Pervenets	213	8/30/2014	59.27	-178.39	338.8	2.9	969	305	3.9
Pervenets	214	8/31/2014	59.30	-178.33	358.5	2.5	907	494	3.7
Pervenets	215	8/31/2014	59.35	-178.21	207.8	3.9	815	738	3.3
Pervenets	216	8/31/2014	59.38	-178.19	327.2	3.7	1,219	748	3.3
Pervenets	217	8/31/2014	59.35	-178.16	455.6	3.9	1,784	696	3.4
Pervenets	218	8/31/2014	59.32	-178.23	406.3	3.7	1,518	611	3.5
Pervenets	219	8/31/2014	59.30	-178.14	399.7	3.0	1,190	364	3.8
Pervenets	220	8/31/2014	59.34	-178.04	373.3	3.6	1,328	602	3.6
Pervenets	221	8/31/2014	59.38	-178.01	389.8	4.0	1,559	516	3.6

Appendix Table A1. -- Continued.

Canyon/ Region	Transect #	Date (mm/dd/yy)	Start Lat.	Start Long.	Distance (m)	Swath (m)	Area (m^2)	Mean Depth (m)	Mean Temp. (°C)
Pervenets	222	8/31/2014	59.38	-178.07	518.9	4.0	2,052	561	3.6
Pervenets	223	8/31/2014	59.46	-177.97	491.3	4.0	1,946	392	3.7
Pervenets	224	9/1/2014	59.43	-177.63	464.6	3.4	1,593	273	3.5
Pervenets	225	9/1/2014	59.26	-177.66	213.7	3.4	735	261	3.4
Pribilof	226	9/2/2014	56.09	-168.82	165.5	2.3	373	717	3.3
Bering to Pribilof	227	9/2/2014	55.83	-168.93	395.8	3.6	1,424	705	NA
Bering to Pribilof	228	9/2/2014	55.41	-168.32	248.4	3.3	808	753	3.2
Bering to Pribilof	229	9/2/2014	55.40	-168.29	248.5	4.3	1,058	575	3.5
Bering to Pribilof	230	9/3/2014	55.35	-168.17	270.3	3.0	799	688	NA
Bering to Pribilof	231	NA	NA	NA	NA	NA	NA	NA	NA
Bering	232	9/3/2014	54.71	-165.68	338.6	2.6	895	271	4.0
Bering	233	9/3/2014	54.70	-165.60	317.8	2.6	824	274	4.0
Bering	234	9/3/2014	54.69	-165.56	149.2	3.7	552	277	4.0
Bering	235	9/3/2014	54.67	-165.59	226.1	2.1	475	298	3.9
Bering	236	9/3/2014	54.60	-165.51	220.1	3.7	804	168	4.2
Bering	237	9/3/2014	54.58	-165.57	207.3	2.1	444	229	4.0
Bering to Pribilof	238	9/4/2014	55.29	-167.79	555.6	4.3	2,366	217	4.1
Outer Shelf	239	9/4/2014	55.15	-167.68	372.7	3.3	1,215	278	4.0
Bering to Pribilof	240	9/4/2014	55.05	-167.64	228.1	2.3	534	346	3.9
Bering to Pribilof	241	9/4/2014	54.92	-167.45	143.7	1.6	223	394	3.9
Outer Shelf	242	9/4/2014	54.91	-167.40	160.1	2.5	404	371	3.9
Bering to Pribilof	243	9/4/2014	54.82	-167.45	215.4	2.2	483	504	3.6
Outer Shelf	244	9/4/2014	54.86	-167.17	282.8	2.7	765	321	4.0
Outer Shelf	245	9/4/2014	54.66	-167.19	210.8	1.9	406	453	3.7
Outer Shelf	246	9/4/2014	54.58	-167.12	275.3	2.9	787	451	3.7
Bering to Pribilof	247	9/4/2014	54.53	-167.22	266.9	2.9	764	505	3.6
Bering to Pribilof	248	9/5/2014	54.53	-167.51	166.2	2.2	362	670	3.4
Bering to Pribilof	249	9/5/2014	54.42	-167.40	214.8	2.3	504	664	3.4
Bering to Pribilof	250	9/5/2014	54.42	-167.15	128.4	2.5	326	566	3.5
Outer Shelf	251	9/5/2014	54.44	-167.05	212.0	2.2	471	513	3.6
Outer Shelf	252	9/5/2014	54.49	-167.02	162.1	2.2	356	472	3.7

RECENT TECHNICAL MEMORANDUMS

Copies of this and other NOAA Technical Memorandums are available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22167 (web site: *www.ntis.gov)*. Paper and electronic (.pdf) copies vary in price.

AFSC-

312 LAAKE, J. L., S. R. MELIN, A. J. ORR, D. J. GREIG, K. C. PRAGER, R. L. DeLONG, and J. D. HARRIS. 2016. California sea lion sex- and age-specific morphometry, 21 p. NTIS number pending.

311 GUTHRIE, C. M. III, HV. T. NGUYEN, and J. R. GUYON. 2016. Genetic stock composition analysis of the Chinook salmon bycatch samples from the 2014 Gulf of Alaska trawl fisheries, 31 p. NTIS No. PB2016-101398.

310 GUTHRIE, C. M. III, HV. T. NGUYEN, and J. R. GUYON. 2016. Genetic stock composition analysis of the Chinook salmon bycatch from the 2014 Bering Sea walleye pollock (Gadus chalcogrammus) trawl fishery, 25 p. NTIS No. PB2016-101397.

309 GUTHRIE, C. M. III, Hv. T. NGUYEN, and J. R. GUYON. 2016. Genetic stock composition analysis of the Chinook salmon bycatch from the 2014 Bering Sea walleye pollock (*Gadus chalcogrammus*) trawl fishery, 25 p. NTIS No. PB2016-101396.

308 DALY, B. J., C. E. ARMISTEAD, and R. J. FOY. 2015. The 2015 eastern Bering Sea continental shelf bottom trawl survey: Results for commercial crab, 167 p. NTIS No. PB2016-100681.

307 FAUNCE, C. H. 2015. An initial analysis of alternative sample designs for the deployment of observers in Alaska, 33 p. NTIS No. PB206-100705.

306 HIMES-CORNELL, A., S. KASPERSKI, K. KENT, C. MAGUIRE, M. DOWNS, S. WEIDLICH, and S. RUSSELL. 2015. Social baseline of the Gulf of Alaska groundfish trawl fishery: Results of the 2014 social survey, 98 p. plus Appendices. NTIS No.PB2016-100045.

305 FISSEL, B. E. 2015. Methods for the Alaska groundfish first-wholesale price projections: Section 6 of the Economic Status of the Groundfish Fisheries off Alaska, 39 p. NTIS No. PB2016-100044 .

304 HIMES-CORNELL, A., and K. KENT. 2015. Industry perceptions of measures to affect access to quota shares, active participation, and lease rates in the Bering Sea and Aleutian Islands crab fisheries. U.S. Dep. Commer., 67 p. NTIS No. PB2016-100043.

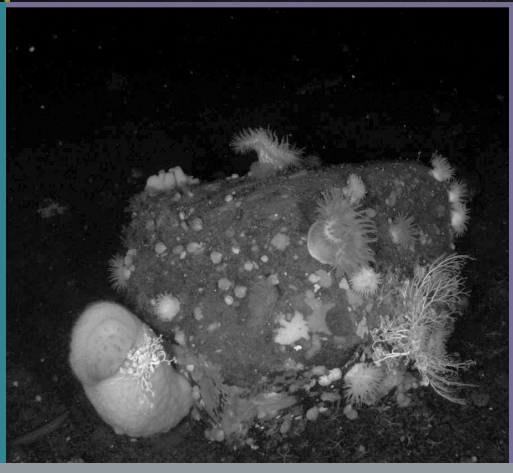
303 GRAY, A. K., C. J. RODGVELLER, and C. R. LUNSFORD. 2015. Evidence of multiple paternity in quillback rockfish (*Sebastes maliger*), 25 p. NTIS No. PB2016-100036.

302 FAUNCE, C., J. GASPER, J. CAHALAN, S. LOWE, R. WEBSTER, and T. A'MAR. 2015. Deployment performance review of the 2014 North Pacific Groundfish and Halibut Observer Program, 55 p. NTIS PB2015-105670.

301 ALLEN, B. M., and R. P. ANGLISS. 2015. Alaska marine mammal stock assessments, 2014, 304 p. NTIS No. PB2015-105669.

300 HELKER, V. T., B. M. ALLEN, and L. A. JEMISON. 2015. Human-caused injury and mortality of NMFS-managed Alaska marine mammal stocks, 2009-2013, 94 p. NTIS No. PB2015-105160.

299 LEW, D. K., G. SAMPSON, A. HIMES-CORNELL, J. LEE, and B. GARBER-YONTS. 2015. Costs, earnings, and employment in the Alaska saltwater sport fishing charter sector, 2011-2013, 134 p. NTIS No. PB2015-104937.

298 PRESCOTT, M. M., and M. ZIMMERMANN. 2015. Smooth sheet bathymetry of Norton Sound, 23 p. NTIS No. PB2015-104936.

297 VON SZALAY, P. G. 2015. The impact of sample size reduction on the precision of biomass estimates in the Gulf of Alaska, 17 p. NTIS No. PB2016-100042.